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WHITE PINE BLISTER RUST CONTROL
IN THE
NORTHWESTERN REGION

January 1 to December 31, 1942

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United States Department of Agriculture
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Division of Plant Disease Control
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WHITE PINE BLISTER RUST CONTROL IN THE NORTHWESTERN REGION

January 1 to December 31, 1942

Herman E. Swanson, Senior Pathologist

* * * * *

Funds for white pine blister rust control contained in the Agricultural Appropriation Act are allotted to specific financial projects. In some instances these financial projects have been subdivided into work projects. In the Northwestern Region the following projects are involved.

Bureau of Entomology and Plant Quarantine:

Work Projects: BLR-1-4, Leadership, coordination and technical direction of white pine blister rust control in the Northwestern Region.

BLR-3-4, Cooperative blister rust control on state and privately-owned lands in the Northwestern Region.

Forest Service:

Financial Project: BLR-4, Blister rust control operations on National Forests. (Not yet divided into work projects.)

Department of Interior:

Financial Project: BLR-5, Blister rust control on National Parks.

Brief reports covering the four above mentioned projects are presented. As in previous annual reports, the practice of reporting by individual operations is continued. Each operation constitutes an individual territorial unit, supervised by a separate field organization, and generally includes a National Forest and adjacent state and private lands. Thus there is a certain amount of uniformity of technical problems within an operation and this represents a more satisfactory unit for presenting technical data and descriptions of field conditions. In addition, there is definite interest on the part of co-operators in the progress of control work on lands of all ownerships within their respective territories.

I. Leadership, Coordination and Technical Direction of White Pine Blister Rust Control in the Northwestern Region by the Bureau of Entomology and Plant Quarantine. Work Project BLR-1-4.

White pine blister rust control work in the 1942 season was handicapped to a great degree by conditions resulting from the war emergency. CCC and WPA crews, which during the past several years had contributed much to blister rust control, were lost to the project. The great expansion in the Inland Empire of war industries and the building of Army and Navy plants and training stations caused a serious labor shortage which meant that blister rust workers

had to be recruited largely from high school and college students and it was not possible for any agency to maintain its blister rust camps at full strength during the season. Heavy rainfall prevented the performance of much field work in May and June which also resulted in a high turnover of labor.

These factors caused a serious reduction in the total control program with the result that only 49,906 acres were worked in 1942, of which 7,147 acres represented initial working and 42,759 acres reeradication. The total progress of control through 1942 is as follows: 1,890,674 acres first working; 450,360 acres reeradication; 591,576 acres unworked; 205,494 acres on a deferred basis. These data apply to a white pine area of 2,687,744 acres in the states of Idaho, Montana and Washington and do not include Colorado and Wyoming, where except for an experimental ribes eradication project no extensive control work has been done.

The heavy rains in May and June were favorable for intensification of blister rust on areas where fruiting blister rust cankers were numerous. As in 1941, the heaviness of the rainfall appeared to restrict the distance of spread from pine to ribes as indicated by the small amount of infection on ribes where pine infection was light.

Substantial progress has been made in controlling blister rust in this region. On a conservative estimate approximately one million acres of white pine have been permanently protected by eradication of ribes or have been placed on a deferred basis, with a considerable additional acreage requiring a small amount of rework to accomplish permanent control. The major portion of the control effort during the last several years has been devoted to completing work on such areas. About 50 per cent of the 1,405,867 acres given initial working during the height of emergency relief work projects in 1933-1936 required additional workings and aggressive efforts have been made since 1937 to complete this job.

Through 1942, the initial treatment is 76 per cent completed and the estimated rework job providing the entire control area is given initial working is about 22 per cent completed.

Under Work Project BLR-1-4, the Bureau of Entomology and Plant Quarantine is responsible under the Agricultural Appropriation Acts for general leadership in the control of blister rust in the states of Idaho, Montana, Washington, Colorado and Wyoming. In this capacity it represents the public in the planning and coordination of control projects and provides technical direction in the application of control measures on forest land of all types of ownership, public and private, either directly or in cooperation with the owners or agencies administering such land.

These responsibilities are administered through the Northwestern Region Blister Rust Control Office located at Spokane, Washington. In 1942, the regional staff employed under this project was as follows:

1. Regional Leader in Charge, H. E. Swanson, Senior Pathologist
2. Assistant Regional Leader, E. L. Joy, Forester
3. Cooperative Local Control:

- a. Montana Operation:

Technical Supervisor, A. S. Skoglund, Assistant Pathologist

- b. Clearwater Operation, Idaho:

Technical Supervisor, F. J. Heinrich, Associate Pathologist

Checking Supervisor, H. J. Faulkner, Chief Scientific Aid

- c. St. Joe Operation, Idaho:

Technical Supervisor, H. J. Hartman, Associate Forester

Checking Supervisor, W. F. Painter, Assistant Pathologist

Assistant Supervisor, J. C. Gynn, Assistant Pathologist

- d. Coeur d'Alene Operation, Idaho:

Technical Supervisor, R. L. MacLeod, Associate Pathologist

- e. Kaniksu Operation, Idaho and Washington:

Technical Supervisor, F. O. Walters, Associate Pathologist

Checking Supervisor, H. A. Brischle, Assistant Pathologist

- f. National Parks:

Technical Supervisor, M. C. Riley, Associate Forester

4. Projects:

- a. Control Investigations:

C. R. Stillinger, Assistant Pathologist

C. M. Chapman, Chief Scientific Aid

R. E. Myers, Agent

- b. Education and Information:

H. M. Cowling, Chief Scientific Aid

J. C. Gonyou, Assistant Engineering Draftsman

- c. Development of Ribes Eradication Methods:

V. D. Moss*, Associate Forest Ecologist

J. F. Breakey*, Assistant Pathologist

5. Business Administration and Clerical:

- a. E. G. Schmidt, Senior Administrative Assistant

E. K. LaPrey, Field Assistant

L. C. Miller, Senior Automobile Mechanic

- b. M. L. McWold, Senior Clerk

M. M. McLean, Assistant Clerk-Stenographer

- c. L. E. Klatt, Senior Clerk

J. R. Pringle, Assistant Clerk-Stenographer

M. Wilson, Junior Clerk-Stenographer

L. M. Metzger, Junior Clerk-Stenographer

- d. H. D. Langley, Junior Administrative Assistant in charge of personnel

*Personnel assigned to Northwestern Region by H. R. Offord, in charge of methods development in the West. Work Project: BLR-1-6.

The Northwestern Region Office of Blister Rust Control cooperated with the U. S. Forest Service, National Park Service, State of Idaho, and the Clearwater, Potlatch, and Priest Lake Timber Protective Associations of Idaho in providing the technical direction and planning of the field work. This included the location and designation of work areas for 34 camps and 1,464 workers on National Forests, 2 camps and 70 workers on National Parks, and 7 camps and 290 workers on state and private lands. Throughout the season, technical direction, training of field workers and checking of work areas was maintained to secure proper eradication methods and to insure attainment of protection standards. Preeradication surveys were made on 19,315 acres and 54 miles of disease survey strip were run to determine the status of the rust and the urgency of ribes eradication work. Uniform maps and records were maintained showing the areas on which work was performed and the control status of all areas.

A summary of the progress of ribes eradication during 1942 and during the entire period of control work in the Northwestern Region is presented in tables 1 and 2:

TABLE 1

PROGRESS OF RIBES ERADICATION IN THE NORTHWESTERN REGION
IN 1942

State	Ownership	Acres Worked			
		First	Second	Third	Total
Idaho	National Forests	4,627	15,799	4,244	24,670
	Public Domain		245	60	305
	State	269	5,131	624	6,024
	Private	90	6,335	4,560	10,985
	Total	4,986	27,510	9,488	41,984
Montana	National Forests	512	880	656	2,048
	National Parks	262	731		993
	Private		76	416	492
	Total	774	1,687	1,072	3,533
Washington	National Forests	1,387	798		2,185
	National Parks		71	2,133	2,204
	Total	1,387	869	2,133	4,389
Northwestern Region	National Forests	6,526	17,477	4,900	28,903
	National Parks	262	802	2,133	3,197
	Public Domain		245	60	305
	State	269	5,131	624	6,024
	Private	90	6,411	4,976	11,477
	Total	7,147	30,066	12,693	49,906

TABLE 2

STATUS OF RIBES ERADICATION IN THE NORTHWESTERN REGION, 1923-1942

State	Ownership	Acres Worked				Acres Unworked	Acres Deferred	Total White Pine Area
		First	Second	Third	Total			
Idaho	Nat. Forest	867,326	196,344	23,648	1,087,318	206,310	56,454	1,130,090
	Pub. Domain	16,482	5,570	202	22,254	14,068	1,040	31,590
	State	264,018	48,097	7,868	319,983	48,822	32,110	344,950
	Private	489,695	98,601	17,149	605,445	215,398	95,932	801,025
	Total	1,637,521	348,612	48,867	2,035,000	484,598	185,536	2,307,655
Montana	Nat. Forest	104,266	7,256	1,553	113,075	42,149	17,468	163,883
	Nat. Parks	2,895	731		3,626	7,105		10,000
	Pub. Domain	40			40			40
	State	576			576	234		810
	Private	20,857	2,043	1,676	24,576	12,660	2,490	36,007
	Total	128,634	10,030	3,229	141,893	62,148	19,958	210,740
Washington	Nat. Forest	69,440	13,748	633	83,821	29,870		99,310
	Nat. Parks	8,254	5,028	3,944	17,226			8,254
	Pub. Domain	315	60		375			315
	State	6,832	3,935	2,114	12,881	3,018		9,850
	Private	39,678	7,593	2,567	49,838	11,942		51,620
	Total	124,519	30,364	9,258	164,141	44,830		169,349
Subtotal	Nat. Forest	1,041,032	217,348	25,834	1,284,214	278,329	73,922	1,393,283
	Nat. Parks	11,149	5,759	3,944	20,852	7,105		18,254
	Pub. Domain	16,837	5,630	202	22,669	14,068	1,040	31,945
	State	271,426	52,032	9,982	333,440	52,074	32,110	355,610
	Private	550,230	108,237	21,392	679,859	240,000	98,422	888,652
	Total	1,890,674	389,036	61,354	2,341,034	591,576	205,494	2,687,744
Colorado	Nat. Forest	14,859	1,962		16,821	184,141		199,000
	Nat. Parks					7,000		7,000
	Total	14,859	1,962		16,821	191,141		206,000
Wyoming	Nat. Forest	21,760			21,760	200,240		222,000
	Nat. Parks					18,700		18,700
	Indian Res.					11,000		11,000
	Total	21,760			21,760	229,940		251,700
Subtotal	Nat. Forest	36,619	1,962		38,581	384,381		421,000
	Nat. Parks					25,700		25,700
	Indian Res.					11,000		11,000
	Total	36,619	1,962		38,581	421,081		457,700
Total North-western Region	Nat. Forest	1,077,651	219,310	25,834	1,322,795	662,710	73,922	1,814,283
	Nat. Parks	11,149	5,759	3,944	20,852	32,805		43,954
	Pub. Domain	16,837	5,630	202	22,669	14,068	1,040	31,945
	Indian Res.					11,000		11,000
	State	271,426	52,032	9,982	333,440	52,074	32,110	355,610
	Private	550,230	108,237	21,392	679,859	240,000	98,422	888,652
	Total	1,927,293	390,968	61,354	2,379,615	1,012,657	205,494	3,145,444

Funds for blister rust control work in the Northwestern Region are provided by federal, state and private agencies.

	<u>Fiscal Year 1942</u>	<u>Fiscal Year 1943</u>
<u>Regular Federal Allotments:</u>		
Bureau of Entomology and Plant Quarantine:		
Work Project BLR-1-4	\$ 75,605.74	\$ 80,000.00
Work Project BLR-3-4	<u>27,041.00</u>	<u>64,695.00</u>
Subtotal	\$102,646.74	\$144,695.00
Forest Service:		
Financial Project BLR-4	\$494,000.00	\$706,000.00
National Park Service:		
Financial Project BLR-5	\$ <u>14,000.00</u>	\$ <u>24,190.00</u>
Total Federal Allotments	\$609,441.00	\$874,885.00

State and Private Funds: (Deposited with U. S. Treasury)

State of Idaho	\$14,243.60	\$22,106.35
Clearwater Timber Protective Association	6,366.32	6,000.00
Potlatch Timber Protective Association	5,107.46	5,200.34
Priest Lake Timber Protective Association	<u>4,282.62</u>	<u>4,240.44</u>
Total State and Private Funds	\$30,000.00	\$37,547.13

The expenditures from the above allotments during the calendar year 1942 were as follows:

	<u>Idaho</u>	<u>Montana</u>	<u>Washington</u>	<u>Total</u>
Bureau of Entomology and Plant Quarantine:				
Work Project BLR-1-4	\$ 65,670.54	\$10,528.08	\$ 7,178.49	\$ 83,377.11
Work Project BLR-3-4	<u>38,880.58</u>	<u>-</u>	<u>-</u>	<u>38,880.58</u>
Total	\$104,551.12	\$10,528.08	\$ 7,178.49	\$122,257.69
Forest Service:				
Financial Project BLR-4	\$411,127.14	\$39,740.29	\$37,953.70	\$488,821.13
National Park Service:				
Financial Project BLR-5	<u>-</u>	<u>\$ 8,755.42</u>	<u>\$ 8,328.73</u>	<u>\$ 17,084.15</u>
Subtotal-Federal Funds	\$515,678.26	\$59,023.79	\$53,460.92	\$628,162.97
State and Private	\$ <u>38,202.46</u>	<u>-</u>	<u>-</u>	\$ <u>38,202.46</u>
Total Expenditures	\$553,880.72	\$59,023.79	\$53,460.92	\$666,365.43

A summary of the expenditures, not including cost of CCC work, on blister rust control activities for all years, 1922-1942, is as follows:

Bureau of Entomology and Plant Quarantine: (1922-1942)

<u>State</u>	<u>Regular</u>	<u>ERA(WPA)</u>	<u>NIRA(PWA)</u>	<u>Total</u>
Idaho	\$1,338,835.61	\$3,002,140.71	\$470,841.62	\$4,811,817.94
Montana	211,572.00	196,847.11	88,306.79	496,725.90
Washington	<u>226,770.96</u>	<u>459,112.87</u>	<u>105,199.60</u>	<u>791,083.43</u>
Subtotal	1,777,178.57	3,658,100.69	664,348.01	6,099,627.27
Colorado	11,852.04	59,396.51	8,041.45	79,290.00
Wyoming	<u>11,314.28</u>	<u>58,283.96</u>	<u>7,107.41</u>	<u>76,705.65</u>
Subtotal	23,166.32	117,680.47	15,148.86	155,995.65
Grand Total	\$1,800,344.89	\$3,775,781.16	\$679,496.87	\$6,255,622.92

Forest Service: (1930-1942)

<u>State</u>	<u>Regular</u>	<u>ERA(WPA)</u>	<u>NIRA(PWA)</u>	<u>Total</u>
Idaho	\$2,921,679.00	\$421,155.19	\$1,369,184.16	\$4,712,018.35
Montana	214,810.65	136,851.46	149,858.06	501,520.17
Washington	<u>172,559.42</u>	<u>-</u>	<u>134,320.68</u>	<u>306,880.10</u>
Total	\$3,309,049.07	\$558,006.65	\$1,653,362.90	\$5,520,418.62

National Park Service: (1930-1942)

<u>State</u>	<u>Regular</u>
Montana	\$ 8,755.42
Washington	<u>39,454.73</u>
Total	\$48,210.15

State and Private: (1928-1942)

<u>State</u>	<u>State</u>	<u>Private</u>	<u>Total</u>
Idaho	\$162,452.91	\$119,580.81	\$282,033.72*

*Funds deposited with the U. S. Treasury and expended by the Bureau of Entomology and Plant Quarantine.

II. Omnibus Tables

Complete summaries of blister rust control work are presented in the following tables. In the summary of expenditures, CCC work is valued at \$1.50 per CCC man-day on ribes eradication. Values are also placed on contributed service from state and private agencies and are listed as "indirect aid." One thousand dollars of the Idaho blister rust appropriation expended by the state is included under "direct aid."

O M N I B U S T A B L E S

* * *

TABLE 1

SUMMARY OF 1942 RIBES ERADICATION

State	Initial Eradication Work			Reeradication Work			Totals		
	Acre- age Worked	Number Ribes Destroyed	Number 8-Hour Man- Days	Acre- age Worked	Number Ribes Destroyed	Number 8-Hour Man- Days	Acre- age Worked	Number Ribes Destroyed	Number 8-Hour Man- Days
Idaho	4,986	1,448,154	9,699	36,993	2,737,095	35,549	41,984	4,235,229	45,248
Mon- tana	774	371,368	2,240	2,759	320,532	2,579	3,533	691,900	4,819
Wash- ington	1,387	684,757	2,225	3,002	44,360	1,600	4,389	729,117	3,925
Total	7,147	2,504,259	14,264	42,759	3,151,987	39,728	49,906	5,656,246	53,992

State	Ribes Per Acre		Man-Days Per Acre		Number Regular Camps	Number of Employees		
	Initial Eradica- tion	Reeradi- cation	Initial Eradica- tion	Reeradi- cation		Regular Laborers	All Super- vision	Total Employees
Idaho	290	75	1.95	.96	36	1,485	66	1,551
Mon- tana	480	116	2.89	.93	4	156	8	164
Wash- ington	494	15	1.68	.52	3	105	4	109
Total	350	74	2.00	.93	43	1,746	78	1,824

TABLE 2

SUMMARY OF 1942 RIBES ERADICATION - BY PROGRAMS (Including all work - initial and reeradication)

All work performed by regular and cooperative crews.

TABLE 3

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP - 1942

Land Ownership	Initial Eradication			Reeradication			Totals		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days
National Forests	6,526	2,164,002	13,255	22,377	1,951,587	23,588	28,903	4,115,589	36,843
Other Public Domain	-	-	-	305	23,410	315	305	23,410	315
National Parks	262	37,155	301	2,935	136,396	1,934	3,197	173,551	2,235
Subtotal Federal	6,788	2,201,157	13,556	25,617	2,111,393	25,837	32,405	4,312,550	39,393
State and Private	359	303,102	708	17,142	1,040,594	13,891	17,501	1,343,696	14,599
Grand Total	7,147	2,504,259	14,264	42,759	3,151,987	39,728	49,906	5,656,246	53,992
NATIONAL PARKS									
Mount Rainier	-	-	-	2,204	13,790	1,171	2,204	13,790	1,171
Glacier	262	37,155	301	731	122,606	763	993	159,761	1,064
Total	262	37,155	301	2,935	136,396	1,934	3,197	173,551	2,235
STATE AND PRIVATE LANDS									
Idaho	359	303,102	708	16,650	1,006,294	13,534	17,009	1,309,396	14,242
Montana	-	-	-	492	34,300	357	492	34,300	357
Total	359	303,102	708	17,142	1,040,594	13,891	17,501	1,343,696	14,599
NATIONAL FORESTS									
Clearwater	1,616	-	-	1,758	-	-	3,374	-	-
St. Joe	50	-	-	12,055	-	-	12,105	-	-
Coeur d'Alene	1,114	-	-	1,744	-	-	2,858	-	-
Keniksu	3,234	-	-	5,284	-	-	8,518	-	-
Cabinet	512	-	-	1,536	-	-	2,048	-	-
Total	6,526	2,164,002	13,255	22,377	1,951,587	23,588	28,903	4,115,589	36,843

TABLE 4

SUMMARY OF ALL OTHER CONTROL WORK FOR 1942

State	Nursery Sanitation					Mapping Control Areas		Treatment of Infected White Pine			
	Number Nurs. Worked	Number White Pines in Nurseries	Number Acres Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Number Acres Mapped (W.P. & Prot. Zones)	Number 8-Hour Man-Days	Total Number Pines Examined	Number Infected Pine Cut Down	Number Infected Pines Treated	Number 8-Hour Man-Days
Idaho	-	-	-	-	-	19,315	128	8,592	850	7,742	88
Montana	1	12,500,000	613	164,372	754	-	-	1,100	50	390	4
Washington	-	-	-	-	-	-	-	5,824	-	3,669	53
Total	1	12,500,000	613	164,372	754	19,315	128	15,516	900	11,801	145

TABLE 5

SUMMARY OF EXPENDITURES FOR 1942

State	Total			Reconciliation of Federal Funds					
	Federal (All Agencies Including State WPA Projects)	State (Including All Coop. Funds)	Grand Total	Regular Funds					Emergency Funds State W.P.A.
				Bureau of Entomology and Plant Quarantine		Forest Service	National Parks	Total Regular Funds	
				Leadership & Coord. (3101)	Lee Act (3103)				
Idaho	\$529,838.41	\$40,202.46	\$570,040.87	\$65,670.54	\$38,880.58	\$411,127.14	-	\$515,678.26	\$14,160.15
Montana	59,023.79	3,000.00	62,023.79	10,528.08	-	39,740.29	8,755.42	59,023.79	-
Washington	54,315.22	1,000.00	55,315.22	7,178.49	-	37,953.70	8,328.73	53,460.92	854.30
Total	\$643,177.42	\$44,202.46	\$687,379.88	\$83,377.11	\$38,880.58	\$488,821.13	\$17,084.15	\$628,162.97	\$15,014.45

State	Financial Projects								
	BLR-1 - Leadership, Coordination and Technical Direction				BLR-3 - Cooperative Blister Rust Control on State and Privately-Owned Lands			BLR-4 Forest Service	BLR-5 National Parks
	Indirect Aid State*	Federal		Total	Direct Aid State*	Federal-Regular	Total		
		Regular	Emergency						
Idaho	\$1,000.00	\$65,670.54	\$14,160.15	\$80,830.69	\$39,202.46	\$38,880.58	\$78,083.04	\$411,127.14	-
Montana	3,000.00	10,528.08	-	13,528.08	-	-	-	39,740.29	\$ 8,755.42
Washington	1,000.00	7,178.49	854.30	9,032.79	-	-	-	37,953.70	8,328.73
Total	\$5,000.00	\$83,377.11	\$15,014.45	\$103,391.56	\$39,202.46	\$38,880.58	\$78,083.04	\$488,821.13	\$17,084.15

*Including all local cooperative funds

TABLE 1A

SUMMARY OF ALL RIBES ERADICATION 1918-1942 (INCLUSIVE)

State	Initial Eradication Work				Reeradication Work			
	Gross Acreage Reported Initially Worked	Net Acreage Worked in Control Area	Number Ribes Destroyed	Number 8-Hour Men-Days	Gross Acreage Reported Reworked	Net Acreage Reworked in Control Area	Number Ribes Destroyed	Number 8-Hour Men-Days
Idaho	1,637,521	1,637,521	320,787,595	1,321,602	397,479	397,479	56,123,666	429,332
Montana	128,634	128,634	16,716,277	90,364	13,259	13,259	1,749,312	16,223
Washington	124,519	124,519	28,552,733	104,636	39,622	39,622	5,752,356	26,249
Subtotal	1,890,674	1,890,674	366,056,605	1,516,652	450,360	450,360	63,631,334	480,804
Colorado	14,859	14,859	410,549	6,292	1,962	1,962	86,896	664
Wyoming	21,760	21,760	1,085,771	6,940	-	-	-	-
Subtotal	36,619	36,619	1,496,420	13,232	1,962	1,962	86,896	664
Total	1,927,293	1,927,293	367,553,025	1,529,884	452,322	452,322	63,718,230	481,468

State	Initial and Reeradication				Per Acre			
	Gross Initial and Reworked Acreage Reported	Net Acreage Initial and Rework	Number Ribes Destroyed	Number 8-Hour Men-Days	Ribes Initial Erad.	Re-erad.	Initial Erad.	Re-erad.
Idaho	2,035,000	2,035,000	376,917,261	1,750,934	196	141	.91	1.03
Montana	141,893	141,893	18,465,599	106,589	130	132	.70	1.22
Washington	164,141	164,141	34,305,089	139,935	229	145	.54	.89
Subtotal	2,341,034	2,341,034	429,687,939	1,997,456	194	141	.90	1.07
Colorado	16,821	16,821	497,535	6,956	28	44	.42	.34
Wyoming	21,760	21,760	1,085,771	6,940	50	-	.32	-
Subtotal	38,581	38,581	1,583,306	13,896	41	44	.36	.34
Total	2,379,615	2,379,615	431,271,245	2,011,352	191	141	.79	1.06

TABLE 2A

STATUS OF BLISTER RUST CONTROL, 1918-1942, (INCLUSIVE)

State	Acreage of White Pine in Net Control Area	Acreage of Net Control Area (White Pine and Protection Zones)	Acreage of Net Control Area Initially Worked	Acreage of Net Control Area Reworked		Percentage Net Control Area Initially Worked		Acreage in Net Control Area Still Needing Initial Protection	Acreage in Net Control Area Now on Maintenance Basis*
				1st Rework	Other Reworkings	Initially Worked	First Rework		
Idaho	2,122,119	2,122,119	1,637,521	348,612	48,857	77.16	16.43	494,598	677,400
Montana	190,792	190,792	128,634	10,030	3,229	67.42	5.25	62,148	68,700
Washington	169,349	169,349	124,519	30,364	9,258	73.53	17.93	44,830	49,000
Subtotal	2,482,250	2,482,250	1,890,674	389,006	61,354	76.17	15.67	591,576	795,100
Colorado	206,000**	206,000**	14,859	1,962	-	7.21	.95	191,141	8,000
Wyoming	251,700**	251,700**	21,760	-	-	8.55	-	229,940	9,000
Subtotal	457,700	457,700	36,619	1,962	-	8.00	.43	421,091	17,000
Total	2,939,950	2,939,950	1,927,293	390,968	61,354	65.57	13.30	1,012,657	812,100

*Maintenance - Any area on which the ribes are so scarce that danger from blister rust is negligible for an indefinite period. To assure the continuation of this safe condition requires periodic examinations and in some instances ribes eradication by scouting methods.

**Indefinite

TABLE 3A

SUMMARY OF ALL RIBES ERADICATION BY PROGRAMS 1918-1942 (INCLUSIVE)
(Initial and Reeradication)

State	Regular and Cooperative*			W.P.A. and E.R.A.		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Men-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Men-Days
Idaho	591,775	99,676,677	468,901	500,970	91,269,072	411,890
Montana	22,997	3,526,601	24,907	57,800	6,300,929	41,591
Washington	29,730	7,685,647	25,012	39,973	13,632,288	53,107
Subtotal	644,502	110,988,925	518,820	598,743	111,202,199	506,538
Colorado	-	-	-	16,821	497,535	6,956
Wyoming	-	-	-	21,760	1,085,771	6,940
Subtotal	-	-	-	38,581	1,583,306	13,896
Total	644,502	110,988,925	518,820	637,324	112,785,495	520,434

State	C.C.C. and S.C.S.			P.W.A. or N.R.A.			Total Emergency Program (W.P.A.-C.C.C.-P.W.A.)		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Men-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Men-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Men-Days
Idaho	590,414	123,729,240	661,593	351,841	62,242,272	208,450	1,443,225	277,240,584	1,292,033
Montana	17,108	1,795,350	15,273	43,998	6,842,309	24,916	118,896	14,938,998	81,630
Washington	33,288	4,780,400	37,397	61,150	8,206,754	24,419	134,411	26,619,442	114,323
Subtotal	640,810	130,305,490	714,363	456,979	77,291,335	257,685	1,696,532	318,799,014	1,478,556
Colorado	-	-	-	-	-	-	16,821	497,535	6,956
Wyoming	-	-	-	-	-	-	21,760	1,085,771	6,940
Subtotal	-	-	-	-	-	-	38,581	1,583,306	13,896
Total	640,810	130,305,490	714,363	456,979	77,291,335	257,685	1,735,113	320,382,320	1,492,532

*This includes work of the Bureau, cooperating state and private agencies, Forest Service and Interior Department work with regular funds.

TABLE 4A

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP'S 1918-1942 (INCLUSIVE)

Land Ownership	Acreage of White Pine in Net Control Area	Net Control Area		Initial Eradication Work			Reeradication Work				Totals (Initial & Rerwork)			
		Total Acreage	Net Yet Worked Initially	Gross Acreage Reported Initially Worked	Net Acreage Worked in Control Area	Gross Number Ribes Destroyed	Gross Acreage Reported Rerwork	Net Acreage Worked in Control Area	Gross Number Ribes Destroyed	Gross Number and Rerwork Reported	Gross Initial Net Acreage and Rerwork	Gross Number Ribes Destroyed	Gross Number 8-Hour Man-Days	
NATIONAL FORESTS														
National Forests, R-1	1,319,361	1,319,361	278,329	1,041,032	1,041,032	216,877,834	936,961	243,132	243,132	30,968,054	275,139	1,284,214	247,845,888	1,212,100
National Forests, R-2,4	421,000*	421,000*	384,381*	36,619	36,619	1,496,420	13,232	1,962	1,962	86,886	664	38,581	1,583,306	13,896
Subtotal	1,740,361	1,740,361	662,710	1,077,651	1,077,651	2,187,254	950,193	245,144	245,144	31,054,940	275,803	1,322,795	249,429,194	1,225,996
Other Public Domain	30,905	30,905	14,068	16,837	16,837	2,807,572	10,896	5,832	5,832	814,443	6,527	22,669	3,622,015	17,423
National Parks	43,954*	43,954*	32,806*	11,149	11,149	2,001,503	13,204	9,703	9,703	617,743	9,613	20,852	2,613,246	22,817
Indian Reservations	11,000*	11,000*	11,000*	-	-	-	-	-	-	-	-	-	-	-
Subtotal (Federal)	1,826,220	1,826,220	720,583	1,105,637	1,105,637	223,183,329	974,293	260,579	260,579	32,487,126	291,943	1,366,315	255,670,455	1,265,236
State and Private	1,113,730	1,113,730	292,074	821,656	821,656	144,369,696	555,591	191,643	191,643	31,231,094	189,525	1,013,299	1,756,000,790	745,116
Grand Total	2,939,950	2,939,950	1,012,657	1,927,293	1,927,293	367,553,025	1,529,884	452,322	452,322	63,718,220	481,468	2,379,615	4,312,712,245	2,011,352
NATIONAL PARKS														
Mount Rainier	8,254	8,254	-	8,254	8,254	1,640,507	10,070	8,972	8,972	495,137	8,850	17,226	2,135,644	18,920
Glacier	10,000	10,000	7,105	2,895	2,895	360,996	3,134	731	731	122,606	763	3,626	483,602	3,897
Yellowstone	12,900	12,900	12,900	-	-	-	-	-	-	-	-	-	-	-
Grand Teton	5,800	5,800	5,800	-	-	-	-	-	-	-	-	-	-	-
Rocky Mountain	7,000	7,000	7,000	-	-	-	-	-	-	-	-	-	-	-
Total	43,954	43,954	32,805	11,149	11,149	2,001,503	13,204	9,703	9,703	617,743	9,613	20,852	2,619,246	22,817
INDIAN RESERVATIONS														
Shoshone	11,000*	11,000*	11,000*	-	-	-	-	-	-	-	-	-	-	-
STATE AND PRIVATE LANDS														
Idaho	1,017,933	1,017,933	264,220	753,713	753,713	126,141,844	489,796	171,715	171,715	27,100,840	167,189	925,428	153,242,684	656,985
Montana	34,327	34,327	12,894	21,433	21,433	2,773,348	14,835	3,719	3,719	475,489	4,469	25,152	3,248,837	19,304
Washington	61,470	61,470	14,960	46,510	46,510	15,454,504	60,960	16,209	16,209	3,654,765	17,857	62,719	19,109,269	68,827
Total	1,113,730	1,113,730	292,074	821,656	821,656	144,369,696	555,591	191,643	191,643	31,231,094	189,525	1,013,299	1,756,000,790	745,116
NATIONAL FORESTS														
Clearwater	195,870	195,870	46,068	149,802	149,802	-	-	52,863	52,863	-	-	202,665	-	-
St. Joe	300,991	300,991	84,783	216,208	216,208	-	-	84,449	84,449	-	-	300,657	-	-
Coeur d'Alene	348,092	348,092	33,602	314,490	314,490	-	-	53,829	53,829	-	-	368,319	-	-
Kaniken	327,993	327,993	71,727	256,266	256,266	-	-	43,232	43,232	-	-	299,498	-	-
Cabinet	73,954	73,954	16,469	57,485	57,485	-	-	7,644	7,644	-	-	65,129	-	-
Kootenai	72,461	72,461	25,680	46,781	46,781	-	-	1,165	1,165	-	-	47,946	-	-
Subtotal Region 1	1,319,361	1,319,361	278,329	1,041,032	1,041,032	216,877,834	936,961	243,132	243,132	30,968,054	275,139	1,284,214	247,845,888	1,212,100
Region 2	394,000	394,000	357,381	36,619	36,619	1,496,420	13,232	1,962	1,962	86,886	664	38,581	1,583,306	13,896
Region 4	27,000	27,000	27,000	-	-	-	-	-	-	-	-	-	-	-
Total	1,740,361	1,740,361	662,710	1,077,651	1,077,651	218,374,254	950,193	245,144	245,144	31,054,940	275,803	1,322,795	249,429,194	1,225,996

*Indefinite

TABLE 5A
SUMMARY OF ALL OTHER CONTROL WORK, 1918-1942 (INCLUSIVE)

State	Cultivated Black Current Eradication				Nursery Sanitation						
	Number Inspections Made	Number Locations Found	Number Black Currents Destroyed	Number 8-Hour Men-Days	Number of Nurseries		Number Acres Worked			Number Ribes Destroyed	Number 8-Hour Men-Days
					Sanitation Zone Maintained	Sanitation Zone Abandoned	Nurseries Maintaining Zones	Nurseries Which Abandoned Zones	Total Acreage		
Idaho	5,233	2,471	16,553	2,341	-	-	-	-	-	-	-
Montana	1,311	798	5,090	514	1	-	9,391	-	9,391	1,536,723	7,919
Washington	50,050	5,378	78,226	4,218	-	1	-	378	378	20,275	640
Subtotal	56,594	8,647	99,869	7,073	1	1	9,391	378	9,769	1,556,998	9,559
Wyoming	-	-	-	-	1	-	2,038	-	2,038	75,786	567
Total	56,594	8,647	99,869	7,073	2	1	11,429	378	11,807	1,630,784	9,126

State	Mapping Control Areas		Treatment of Infected White Pines			
	Number Acres Mapped (W.P.A. Prot. Zones)	Number 8-Hour Men-Days	Total Number Pines Examined	Number Infected Pines Cut Down	Number Infected Pines Treated	Number 8-Hour Men-Days
Idaho	3,338,175	4,603	1,142,708	39,456	969,139	2,933
Montana	259,675	798	70,926	3,812	66,259	1,141
Washington	146,541	342	350,500	2,369	347,436	871
Subtotal	3,744,391	5,743	1,564,134	45,637	1,382,833	4,945
Colorado	206,000	290	-	-	-	-
Wyoming	328,700	351	-	-	-	-
Subtotal	534,700	641	-	-	-	-
Total	4,279,091	6,384	1,564,134	45,637	1,382,833	4,945

TABLE 6A
SUMMARY OF ALL EXPENDITURES, 1918-1942 (INCLUSIVE)

State	Federal (All Agencies Including State WPA Projects)	State (Including All Coop. Funds)		Grand Total (State and Federal Funds)	Recapitulation of Regular Funds			
		Indirect Aid	Direct Aid (Ribes Erad.)		B.P.I. & B.E.P.C.	Forest Service	National Parks	Total
Idaho	\$10,550,525.94	\$25,861.00	\$283,033.72	\$11,039,420.66	\$1,339,835.61	\$2,921,679.00	-	\$4,260,514.61
Montana	1,049,910.99	109,000.00	-	1,158,910.99	211,572.00	214,810.65	8,755.42	435,138.07
Washington	1,194,368.06	78,000.00	-	1,272,368.06	226,770.96	172,559.42	19,454.72	418,785.11
Subtotal	12,794,814.99	412,861.00	283,033.72	13,490,709.71	1,777,178.57	3,309,049.07	48,210.15	5,134,437.79
Colorado	79,290.00	11,700.00	-	90,990.00	11,852.04	-	-	11,852.04
Wyoming	76,705.65	4,700.00	-	81,405.65	11,314.28	-	-	11,314.28
Subtotal	155,995.65	16,400.00	-	172,395.65	23,166.32	-	-	23,166.32
Total	\$12,910,910.64	\$429,261.00	\$283,033.72	\$13,623,105.36	\$1,800,344.89	\$3,309,049.07	\$48,210.15	\$5,157,604.11

State	Recapitulation of Emergency Funds									
	Federal W.P.A.			State W.P.A. (All Bureau)	C.C.C. and S.C.S.			P.W.A.		
	Bureau	Forest Service	Total		Forest Service and State Camps	Dept. Interior	Total	Bureau	Forest Service	Total
Idaho	\$2,002,140.71	\$421,155.19	\$2,423,295.90	\$14,160.15	\$ 992,539.50	-	\$ 992,539.50	\$470,841.62	\$1,369,184.16	\$1,840,025.78
Montana	196,847.11	126,851.46	323,698.57	-	18,660.00	\$ 4,149.50	22,809.50	88,306.79	149,858.06	238,164.85
Washington	459,112.27	-	459,112.27	854.30	37,057.50	19,038.00	56,095.50	105,199.60	134,320.68	239,520.28
Subtotal	3,658,100.09	548,006.65	4,216,106.74	15,014.45	1,048,257.00	23,287.50	1,071,544.50	664,348.01	1,553,362.90	2,217,710.91
Colorado	59,296.51	-	59,296.51	-	-	-	-	8,041.45	-	8,041.45
Wyoming	58,282.96	-	58,282.96	-	-	-	-	7,107.41	-	7,107.41
Subtotal	117,579.47	-	117,579.47	-	-	-	-	15,148.86	-	15,148.86
Total	\$3,775,781.16	\$548,006.65	\$4,323,787.81	\$15,014.45	\$1,048,257.00	\$23,287.50	\$1,071,544.50	\$679,496.87	\$1,553,362.90	\$2,222,859.77

III. Cooperative Blister Rust Control on State and Privately-Owned Lands in the Northwestern Region. Work Project BLR-3-4.

Sustained yield of white pine is involved on 1,244,262 acres in state and private ownership which comprises 46 per cent of the commercial white pine area of the Inland Empire. The progress of blister rust control on this acreage is: 821,656 acres initial working; 191,643 acres reeradication; 292,074 acres unworked; and 130,523 acres on a deferred basis. The main control problem is in the state of Idaho where 92 per cent of the acreage is located. In Montana and Washington the state and private white pine lands are in widely scattered small blocks intermingled with federal lands, with the exception of the Mount Spokane area in Washington which contains only 315 acres of federal land out of a total of 19,450 acres.

Cooperative agreements between the Bureau of Entomology and Plant Quarantine and the several states and agencies within the states form the working basis for this blister rust control project. From the start of blister rust work in the Northwest, there has been considerable variation in the type of cooperation. With the exception of the state of Idaho and agencies within Idaho, the cooperation from other states and agencies has been indirect through contributed services by state employees or contributed office and laboratory space. In Idaho, where the great acreage of white pine land in state and private ownership occurs, the state and the Timber Protective Associations in north Idaho began in 1928 to make direct financial contributions for blister rust control on their lands.

Federal participation through the Bureau of Entomology and Plant Quarantine up to July 1, 1942 in the cooperative blister rust control program on state and private lands consisted largely in providing the leadership, coordination, and technical direction for blister rust work within the states along with conducting large scale emergency relief work programs primarily located on state and private lands. New significance was attached to the cooperative program by virtue of the Lea Act, under which authority federal funds were first provided for work on state and private lands in the fiscal year 1942. These funds are allotted to states in amounts equal to the funds contributed directly by the state and private agencies for ribes eradication work.

The cooperative blister rust control work on state and private lands in the Northwestern Region constitutes Work Project BLR-3-4. Also federal funds may be allotted under this project for work on state and private lands intermingled with federal lands.

The state of Idaho and the Clearwater, Potlatch and Priest Lake Timber Protective Associations in Idaho are the only agencies qualifying for federal assistance in the Northwestern Region by virtue of their direct financial contributions. On the basis of a cooperative agreement between the Bureau of Entomology and Plant Quarantine and the state of Idaho, the state receives the funds from the participating Timber Protective Associations and turns them over along with the state funds appropriated for blister rust work for deposit with the U. S. Treasurer to be used by the Bureau of Entomology and Plant Quarantine. The last state biennial appropriation was \$38,000 and the

Timber Protective Association contributions for 1941 and 1942 were at the rate of two cents per acre for the total acreage within their respective associations. The Bureau is responsible for the entire direction of the cooperative blister rust project.

In 1942, Work Project BLR-3-4 had three field operations, one on each of the three Timber Protective Associations. Each operation had two camps with a total quota of about 100 workers. Scarcity of labor and the great loss of workers at the start of the season occasioned by heavy rains which prevented working made it impossible to maintain camps at full strength. Nevertheless, the cooperative project about doubled the accomplishments in 1942 as compared with 1941. There were 12,971 acres worked and 1,015,826 ribes destroyed in 1942 as against 7,665 acres worked and 725,072 ribes destroyed in 1941. The increase in 1942 served to make up the greatest part of the loss of WPA and CCC crews on blister rust control.

In the following tables, the progress of ribes eradication on state and private lands is presented. Tables 1 and 3 show the accomplishments in 1942 and for all years under the program financed in part by state and private funds in Idaho. Table 2 shows the number of acres worked on private and state lands in Idaho, Montana and Washington in 1942.

TABLE 1

SUMMARY OF COOPERATIVE RIBES ERADICATION ON STATE AND PRIVATE
LANDS IN IDAHO, 1942

Operation	Number Acres Worked					Man-Days	Ribes Destroyed	Per Acre	
	State	Private	National Forest	Public Domain	Total			Man-Days	Ribes
First Working									
Priest Lake	269				269	525	270,882	1.95	1,007
Second Working									
Clearwater		436			436	302	50,202	.69	115
Potlatch	1,260	2,714	2,155	60	6,189	3,537	192,806	.57	31
Priest Lake	2,488	196			2,684	2,053	353,923	.76	132
Total	3,748	3,346	2,155	60	9,309	5,892	596,931	.63	64
Third Working									
Clearwater	294	2,726	120		3,140	3,229	136,289	1.03	43
Priest Lake	98	155			253	124	11,624	.49	46
Total	392	2,881	120		3,393	3,353	147,913	.99	44
Totals - All Workings									
Clearwater	294	3,162	120		3,576	3,531	186,491	.99	52
Potlatch	1,260	2,714	2,155	60	6,189	3,537	192,806	.57	31
Priest Lake	2,855	351			3,206	2,702	636,429	.84	199
Total	4,409	6,227	2,275	60	12,971	9,770	1,015,726	.75	78

TABLE 2

SUMMARY OF RIBES ERADICATION ON STATE AND PRIVATE
LANDS, 1942

State	Working	Number of Acres Worked		
		State	Private	Total
Idaho	First	269	90	359
	Second	5,131	6,335	11,466
	Third	624	4,560	5,184
	Total	6,024	10,985	17,009
Montana	Second		76	76
	Third		416	416
	Total		492	492
Total	First	269	90	359
	Second	5,131	6,411	11,542
	Third	624	4,976	5,600
	Total	6,024	11,477	17,501

Note: The additional acres of state and private lands over the number of acres in these ownerships shown in table 1 were intermingled with National Forest lands and were worked by the Forest Service.

TABLE 3

SUMMARY OF COOPERATIVE RIBES ERADICATION
ON STATE AND PRIVATE LANDS IN IDAHO, 1928-1942

Operation	Number Acres Worked	Number Man-Days	Number Ribes Destroyed	Per Acre	
				Man-Days	Ribes
First Working					
Clearwater	24,005	16,862	3,769,434	.70	157
Potlatch	17,073	13,484	3,864,001	.79	226
Priest Lake	111,419	31,454	9,021,759	.28	81
Total	152,497	61,800	16,655,194	.41	109
Second Working					
Clearwater	4,863	3,097	379,652	.64	78
Potlatch	9,329	6,532	361,985	.70	39
Priest Lake	7,639	5,681	807,835	.74	106
Total	21,831	15,310	1,549,472	.70	71
Third Working					
Clearwater	4,313	4,521	244,065	1.05	57
Priest Lake	1,631	1,448	361,706	.89	222
Total	5,944	5,969	605,771	1.00	102
Totals - All Workings					
Clearwater	33,181	24,480	4,393,151	.74	132
Potlatch	26,402	20,016	4,225,986	.76	160
Priest Lake	120,689	38,583	10,191,300	.32	84
Total	180,272	83,079	18,810,437	.46	104

In the following tables, table 4 summarizes the ribes eradication work performed on projects conducted or directly supervised by the Bureau of Entomology and Plant Quarantine and the Bureau of Plant Industry since the start of the program in 1923. This includes the early control work financed by regular federal allotments to the Bureau, the cooperative work on state and private lands, emergency relief work projects financed by PWA and WPA allotments to the Bureau and work performed by crews from S&P-CCC camps. While most of this work was primarily on state and private lands, the intermingled status of ownership resulted in the working of much federal land. The work in Colorado and Wyoming was primarily an experimental control project to test ribes eradication methods and determine control costs in that territory.

Table 5 shows the progress of ribes eradication on state and private lands since the start of the control work according to present ownership. Because of the intermingled ownership of forest land in the Inland Empire, the protection of white pine of any particular ownership can seldom be accomplished without eradicating ribes from adjacent lands of other ownership. Land exchanges and donations of land to the Forest Service have often changed the ownership status from what it was at the time ribes eradication was performed. For these reasons, a summary of ribes eradication performed under individual projects does not give the true picture of the progress of ribes eradication on lands in the particular ownership to which the project was primarily directed. Table 5 presents this information for state and private lands.

TABLE 4

SUMMARY OF ALL RIBES ERADICATION PERFORMED BY THE BUREAU
OF ENTOMOLOGY AND PLANT QUARANTINE, 1923-1942

State	Number Acres Worked	Number Man-Days	Number Ribes Destroyed	Per Acre	
				Man-Days	Ribes
First Working					
Idaho	766,247	500,455	125,315,325	.65	164
Montana	65,469	30,728	5,913,038	.47	90
Washington	48,156	46,892	14,422,701	.97	299
Subtotal	879,872	578,075	145,651,064	.66	166
Colorado	14,859	6,292	410,649	.42	28
Wyoming	21,760	6,940	1,085,771	.32	50
Subtotal	36,619	13,232	1,496,420	.36	41
Total	916,491	591,307	147,147,484	.65	161
Second Working					
Idaho	142,694	135,111	24,063,486	.95	169
Montana	1,961	2,577	565,047	1.31	288
Washington	11,920	12,212	2,634,166	1.02	221
Subtotal	156,575	149,900	27,262,699	.96	174
Colorado	1,962	664	86,886	.34	44
Total	158,537	150,564	27,349,585	.95	173
Third Working					
Idaho	19,227	21,673	2,283,597	1.13	119
Montana	648	777	59,040	1.20	91
Washington	4,681	4,036	768,915	.86	164
Total	24,556	26,486	3,111,552	1.08	127
Totals - All Workings					
Idaho	928,168	657,239	151,662,408	.71	163
Montana	68,078	34,082	6,537,125	.50	96
Washington	64,757	63,140	17,825,782	.98	275
Subtotal	1,061,003	754,461	176,025,315	.71	166
Colorado	16,821	6,956	497,535	.41	30
Wyoming	21,760	6,940	1,085,771	.32	50
Subtotal	38,581	13,896	1,583,306	.36	41
Total	1,099,584	768,357	177,608,621	.70	162

TABLE 5

SUMMARY OF RIBES ERADICATION ON STATE AND PRIVATE LANDS, 1923-1942

State	Working	Number of Acres Worked		
		State	Private	Total
Idaho	First	264,018	489,695	753,713
	Second	48,097	98,601	146,698
	Third	7,868	17,149	25,017
	Total	319,983	605,445	925,428
Montana	First	576	20,857	21,433
	Second		2,043	2,043
	Third		1,676	1,676
	Total	576	24,576	25,152
Washington	First	6,832	39,678	46,510
	Second	3,935	7,593	11,528
	Third	2,114	2,567	4,681
	Total	12,881	49,838	62,719
Total	First	271,426	550,230	821,656
	Second	52,032	108,237	160,269
	Third	9,982	21,392	31,374
	Total	333,440	679,859	1,013,299

Statement of funds expended for calendar year 1942 on Work Project BLR-3-4, in Idaho:

Clearwater Timber Protective Association:

Federal	\$12,727.51
State	9,865.87
Private	<u>6,000.00</u>
Total	\$28,593.38

Potlatch Timber Protective Association:

Federal	\$16,689.55
State	3,809.95
Private	<u>5,200.34</u>
Total	\$25,699.84

Priest Lake Timber Protective Association:

Federal	\$ 9,463.52
State	9,085.86
Private	<u>4,240.44</u>
Total	\$22,789.82

Total for Work Project BLR-3-4:

Federal	\$38,880.58
State	22,761.68
Private	<u>15,440.78</u>
Total	\$77,083.04

Total expenditures from state and private funds on blister rust control in Idaho, 1928-1942:

State	\$162,452.91
Private	<u>119,580.81</u>
Total	\$282,033.72

Significant progress in control of blister rust on state and private lands has been made. There remain 292,000 acres requiring initial control work. Blister rust infection is generally distributed throughout this area and certain blocks are probably too heavily infected to consider attempting control. The major portion of this unprotected area is lower in priority values and more isolated than areas upon which control work has been started. The present size of the control program is not sufficient to permit an appreciable extension of work into unprotected areas.

For the last several years, it has been necessary to devote the major control effort to completing the protection job on areas where the work has been started. Under the large scale emergency relief work programs, great progress was made in initial control work but with the reduction which took place in these projects starting in 1937, it was not possible to carry through with all the necessary reeradication. The performance of the necessary reeradication will continue to have precedence over an extension of initial work.

One of the most important problems developing upon state and private lands, which has increased by the heavy logging to meet war demands for lumber, is the accumulation of a large acreage of cutover lands within the control area. As a result of logging disturbance, a new crop of white pine and numerous ribes generally start on these cutover areas, which represent the best white pine sites in the region. Ribes seed stored naturally in the ground during the early years of a timber stand's establishment is the source of the comeback of ribes when the stand of timber is removed. If white pine is to be grown on these lands, the ribes must be eradicated which requires at least two workings and in many cases a third working to establish protection. The removal of these ribes in the early period of the ecological succession will be the last eradication job required on these lands, because the ribes would be removed before they matured sufficiently to produce and drop seed.

The present size of the project for controlling blister rust on state and private lands is not adequate to obtain control on the entire acreage, although substantial progress has been made and protection of excellent white pine stands is being accomplished. Since blister rust kills mature white pine very slowly, little damage need be anticipated to white pine now merchantable. For this reason, any increase in the participation of private agencies for the control of blister rust in the younger white pine stands seems unlikely, as the private timber owner sees a relatively short operating life ahead and will neither suffer nor benefit directly by the control of blister rust. As much of the state and private lands are so intermingled with federal lands, ribes must be eradicated from all lands in such instances to protect the white pine on federal lands. Increased federal work on lands of intermingled ownership seems to be the only solution for obtaining control of blister rust on a great portion of the state and private lands. In past years, there has been a significant amount of cutover land supporting a new white pine crop donated to the federal government. If this trend continues, blister rust control on these lands will definitely become a federal responsibility.

IV. Blister Rust Control Operations on National Forests. Financial Project BLR-4.

In the Northwestern Region, blister rust control operations conducted by the Forest Service have been located entirely in Region One within the commercial white pine belt of north Idaho, northwestern Montana and northeastern Washington. This project is handled directly by the Forest Service with the assistance of the Bureau of Entomology and Plant Quarantine which under its responsibilities provides the general leadership, coordination and technical direction for the field work. The Forest Service and the Bureau work together under the provisions of a cooperative agreement between the two agencies.

In Region One, there are 1,393,283 acres of white pine land in Forest Service ownership, which comprises about 52 per cent of the white pine control area in the Inland Empire. The progress of control on this acreage is: 1,041,032 acres initial working; 243,182 acres reeradication; 278,329 acres unworked; and 73,922 acres on a deferred basis.

The Forest Service blister rust control program is organized under the Division of Timber Management, with a forest officer in charge of the field project on each National Forest, who works together with a technical supervisor of the Bureau of Entomology and Plant Quarantine. The program on National Forest lands was administered by the following personnel:

Elers Koch, Assistant Regional Forester in charge of Timber Management
Clearwater National Forest, David Kyle, Assistant Forester
St. Joe National Forest, Donald J. Moore, Assistant Pathologist
Merrill D. Oaks, Principal Agricultural Aid
Coeur d'Alene National Forest, Neal D. Nelson, Assistant Forest Supervisor
Kaniksu National Forest, Frank O. Walters, Associate Pathologist
(Assigned by Bureau of Entomology and Plant Quarantine)
Cabinet and Kootenai National Forests, Charles H. Johnson, Associate
Pathologist

The planned program on National Forests for 1942 included 47 camps with a total of 1,500 workers. Early recruitment of workers from colleges and universities throughout the country, together with the employment of all available local residents was initially successful in building up an excellent crew. Adverse weather conditions in June which caused much loss of work time and the great expansion of war activities in the region caused an excessive loss of workers from the project. Some of these were replaced by high school students but it was impossible to keep up with the turnover in workers. The excessive labor turnover greatly handicapped progress of ribes eradication work.

Blister rust crews were given training in fire suppression and were available upon call for fighting forest fires. Although weather conditions were unfavorable to fire, blister rust crews had to be called in several cases. The greatest demand was for crews on the Clearwater National Forest for fighting a serious fire on the Idaho National Forest in Region Four. In 1942, these interruptions in blister rust work to fight fire were somewhat less than in other years.

Table 1 shows the accomplishments for 1942 in ribes eradication by Forest Service crews. Table 2 summarizes the ribes eradication work performed by Forest Service crews since the start of the program. This summary includes the following programs which were administered directly by the Forest Service: Regular, PWA(NIRA), WPA(ERA), and F-CCC. In 1942, all work was performed by regular crews.

TABLE 1

SUMMARY OF RIBES ERADICATION BY THE FOREST SERVICE, 1942

National Forest	Number of Acres Worked					Man-Days	Ribes Destroyed	Per Acre	
	National Forest	Public Domain	State	Private	Total			Man-Days	Ribes
First Working									
Clearwater	1,616			90	1,706	3,903	552,860	2.29	324
St. Joe	50				50	152	5,860	3.04	117
Coeur d'Alene	1,114				1,114	3,005	431,162	2.70	387
Kaniksu	3,234				3,234	4,439	872,127	1.37	270
Cabinet	512				512	1,939	334,213	3.79	653
Total	6,526			90	6,616	13,438	2,196,222	2.03	332
Second Working									
Clearwater	1,638			160	1,798	2,709	955,406	1.51	531
St. Joe	7,227	185	1,383	2,498	11,293	11,010	456,420	.97	40
Coeur d'Alene	1,580			281	1,861	4,139	308,190	2.22	166
Kaniksu	3,997			50	4,047	1,811	181,668	.45	45
Cabinet	880			76	956	1,133	138,295	1.19	145
Total	15,322	185	1,383	3,065	19,955	20,802	2,039,979	1.04	102
Third Working									
St. Joe	2,673	60	232	1,679	4,644	6,269	136,606	1.35	29
Coeur d'Alene	164				164	334	3,066	2.04	19
Kaniksu	1,287				1,287	461	31,465	.36	24
Cabinet	656			416	1,072	683	59,631	.64	56
Total	4,780	60	232	2,095	7,167	7,747	230,768	1.08	32
Totals - All Workings									
Clearwater	3,254			250	3,504	6,612	1,508,266	1.89	430
St. Joe	9,950	245	1,615	4,177	15,987	17,431	598,886	1.09	37
Coeur d'Alene	2,858			281	3,139	7,478	742,418	2.38	237
Kaniksu	8,518			50	8,568	6,711	1,085,260	.78	127
Cabinet	2,048			492	2,540	3,755	532,139	1.49	210
Total	26,628	245	1,615	5,250	33,738	41,987	4,466,969	1.24	132

TABLE 2

SUMMARY OF RIBES ERADICATION BY THE FOREST SERVICE, 1930-1942

National Forest	Number Acres Worked	Number Man-Days	Number Ribes Destroyed	Per Acre	
				Man-Days	Ribes
First Working					
Clearwater	186,594	157,491	47,249,035	.84	253
St. Joe	261,060	272,153	82,014,341	1.04	314
Coeur d'Alene	268,216	301,539	48,524,530	1.12	181
Kaniksu	223,513	137,688	30,173,889	.62	135
Cabinet	40,441	43,243	8,779,912	1.07	217
Kootenai	19,829	13,259	1,662,331	.67	84
Total	999,653	925,373	218,404,038	.93	218
Second Working					
Clearwater	46,243	46,334	6,464,562	1.00	140
St. Joe	84,935	102,597	10,184,553	1.21	120
Coeur d'Alene	48,798	65,492	7,661,607	1.34	157
Kaniksu	39,358	28,991	4,049,115	.74	103
Cabinet	6,067	7,884	728,737	1.30	120
Kootenai	1,271	1,424	118,031	1.12	93
Total	226,672	252,722	29,206,605	1.11	129
Third Working					
Clearwater	3,214	3,237	351,287	1.01	109
St. Joe	15,094	22,633	1,730,276	1.50	115
Coeur d'Alene	9,836	12,609	1,070,647	1.28	109
Kaniksu	2,129	806	124,674	.38	59
Cabinet	2,581	2,798	155,851	1.08	60
Total	32,854	42,083	3,432,735	1.28	104
Totals - All Workings					
Clearwater	236,051	207,062	54,064,884	.88	229
St. Joe	361,089	397,383	93,929,170	1.10	260
Coeur d'Alene	326,850	379,640	57,256,784	1.16	175
Kaniksu	265,000	167,485	34,347,678	.63	130
Cabinet	49,089	53,925	9,664,500	1.10	197
Kootenai	21,100	14,683	1,780,362	.70	84
Total	1,259,179	1,220,178	251,043,378	.97	199

The blister rust control program conducted on National Forest lands is designed to protect the more valuable areas owned by the Forest Service. Actual protection of such lands, because of intermingled ownership, involves the working of other lands. Similarly work on state and private lands, conducted by the Bureau of Entomology and Plant Quarantine involves the working of some federal lands. Since 1939, the acreage in state and private ownership and in public domain worked by the Forest Service has been greater than the National Forest acreage worked by the Bureau. Prior to that time, when the Bureau's program under emergency relief work allotments was larger, the situation was reversed.

Changes in land ownership since ribes eradication work was performed make it necessary to revise annually the tables showing progress of ribes eradication according to present ownership. These changes, primarily donations, have increased the amount of National Forest land in the control area.

Tables 3 and 4, show the amount of National Forest land covered in 1942 and during the period 1923-1942. In 1942, Forest Service crews worked 33,738 acres, while 28,903 acres of National Forest lands were worked. On the other hand for all years, Forest Service crews have worked 1,259,179 acres, but the total acreage of National Forest lands worked is 1,284,214, exclusive of work performed in Colorado and Wyoming.

TABLE 3

PROGRESS OF RIBES ERADICATION ON NATIONAL FOREST LANDS
IN REGION ONE, 1942

National Forest	Number of Acres Worked			
	First	Second	Third	Total
Clearwater	1,616	1,638	120	3,374
St. Joe	50	9,382	2,673	12,105
Coeur d'Alene	1,114	1,580	164	2,858
Kaniksu	3,234	3,997	1,287	8,518
Cabinet	512	880	656	2,048
Total	6,526	17,477	4,900	28,903

TABLE 4

PROGRESS OF RIBES ERADICATION ON NATIONAL FOREST LANDS
IN REGION ONE, 1923-1942

National Forest	Number of Acres Worked				Acres Unworked	Acres Deferred	Acres in Control Area
	First	Second	Third	Totals			
Clearwater	149,802	49,083	3,780	202,665	46,068	8,860	204,730
St. Joe	216,208	74,715	9,734	300,657	84,783	11,089	312,080
Coeur d'Alene	314,490	45,086	8,743	368,319	33,602	10,303	358,395
Kaniksu	256,266	41,208	2,024	299,498	71,727	26,202	354,195
Cabinet	57,485	6,091	1,553	65,129	16,469	3,034	76,988
Kootenai	46,781	1,165		47,946	25,680	14,434	86,895
Total	1,041,032	217,348	25,834	1,284,214	278,329	73,922	1,393,283

Note: 36,619 acres first working; 1,962 acres second working; National Forest lands in Colorado and Wyoming.

Statement of funds expended by the Forest Service for blister rust control work in 1942:

Forest:	<u>Clearwater</u>	<u>St. Joe</u>	<u>Coeur d'Alene</u>	<u>Kaniksu</u>	<u>Cabinet</u>	<u>Total</u>
Amount:	\$80,728.80	\$179,835.55	\$95,946.18	\$92,570.31	\$39,740.29	\$488,821.13

Statement of funds expended by the Forest Service for blister rust control work, not including cost of CCC work, during period 1930-1942:

<u>Forest</u>	<u>Regular</u>	<u>ERA(WPA)</u>	<u>NIRA(PWA)</u>	<u>Total</u>
Clearwater	\$ 687,266.34	\$ 78,808.87	\$ 334,645.93	\$1,100,721.14
St. Joe	1,398,945.69	6,983.40	376,356.66	1,782,285.75
Coeur d'Alene	587,062.25	197,410.60	472,399.21	1,256,872.06
Kaniksu	420,964.14	137,952.32	320,103.04	879,019.50
Cabinet	175,734.51	108,618.46	149,858.06	434,211.03
Kootenai	39,076.14	28,233.00	-	67,309.14
Total	\$3,309,049.07	\$558,006.65	\$1,653,362.90	\$5,520,418.62

The Forest Service blister rust control project is approaching a basis adequate to obtain control on most of the better white pine areas, although the disruption caused by the labor situation in 1942 was a serious setback. Recently the program has been of sufficient size to permit some initial ribes eradication but most of the work has been directed to completion of control on areas where the work has been started. To what extent white pine areas may have to be abandoned because of heavy blister rust damage depends largely on how much ribes eradication can be accomplished in the next four or five years. Much of the 278,329 acres requiring initial ribes eradication is in isolated blocks of white pine in the more remote areas of the national forests and does not rate as high in priority of control as the areas on which second and third workings are being performed. Probably the chief importance of these isolated blocks is their relation to the reestablishment of a valuable cover within some of the 1910 and 1919 burned-over areas. It is questionable whether control work should be attempted in some of these areas such as the Red Ives district of the St. Joe Forest, and on the Clearwater River Canyon of the Clearwater Forest since the rust has already caused extensive damage to the white pine. In 1942, initial work was started on one of the largest unprotected areas of white pine in the region, known as the Moose City area in the Clearwater Forest.

Up to the present the problem of protecting the new crop of white pine following logging on National Forest lands has not become serious as in the case of such areas on state and private lands. The extent of these cutover areas on federal lands is not as great as in the case of other lands and also the Forest Service blister rust control program has been of sufficient scale to meet the need in most cases as it developed.

Further information on the status of blister rust control on the various national forests is to be found in the individual operation reports.

V. Blister Rust Control on National Parks. Financial Project BLR-5.

In the Northwestern Region, there are five national parks on which blister rust control work has been considered, Mount Rainier, Glacier, Yellowstone, Grand Teton and Rocky Mountain. The Bureau of Entomology and Plant Quarantine, working in cooperation with the National Park Service, has conducted preliminary surveys in these parks for the purpose of delimiting control areas and estimating the costs of protection.

Five-needled pines are widely distributed throughout these national parks. Protection of all the five-needled pine areas would be a very costly undertaking and could not be justified on the basis of values involved. For this reason, the National Park Service has followed the policy of protecting the five-needled pines around the developed and principal scenic and recreational areas where pines comprise a significant part of the forest cover. In addition the protection of two or three larger pine areas to be preserved as specimen areas within some of the parks is planned. Under this policy, there have been only 43,954 acres within the five parks designated for control work.

Control work was started on Mount Rainier in 1930 at which time blister rust infection was already well-established. Under these conditions, adherence to a definite time schedule in completing ribes eradication was necessary to secure protection of the white pine. While this was not done, sufficient work was completed early enough on the Longmire, Silver Forest and White River areas to make control possible even though blister rust infection did appear in serious amounts as control work progressed. In the case of the Stevens-Cowlitz area, the delays in the control program resulted in very heavy blister rust infection and it appears advisable to abandon efforts to protect the white pine in this area. If there is a sufficient survival of the original stocking of white pine, together with the new reproduction which is coming in on portions of the area and which up to the present is quite free from blister rust, completion of control work in the Stevens-Cowlitz area may be considered again at a later date. While this rework is a sizable job, it is relatively small compared to the amount of work already performed.

In Glacier National Park, control work was started in 1939. While blister rust infection has been found on ribes throughout the park, only a few blister rust cankers have been found on the pine, all in the Lake MacDonald control area. Work was initiated sufficiently early in Glacier, providing it is completed within three or four years, to obtain and maintain protection of the selected pine areas without difficulty. With blister rust infection in the park, the time is not far off when intensification of the rust may take place where ribes have not been eradicated. Under such conditions, the cost of obtaining control is greatly increased.

In 1942, ribes eradication was continued on Mount Rainier and Glacier, the only parks in the Northwestern Region on which work has been started, with one camp of about 35 workers on each park. Technical direction of the field work was given by a representative from the Bureau of Entomology and Plant Quarantine who trained the foremen and assisted in the training of the crew, checked the efficiency of the work and established work boundaries.

Summaries of the work performed in 1942 are shown in table 1 and the progress for all years in table 2.

TABLE 1

SUMMARY OF RIBES ERADICATION ON NATIONAL PARKS, 1942

National Park	Working	Acres Worked	Man-Days	Ribes Destroyed	Per Acre	
					Man-Days	Ribes
Mount Rainier	Second	71	174	2,714	2.45	38
	Third	2,133	997	11,076	.47	5
	Total	2,204	1,171	13,790	.53	6
Glacier	First	262	301	37,155	1.15	142
	Second	731	763	122,606	1.04	168
	Total	993	1,064	159,761	1.07	161
Total	First	262	301	37,155	1.15	142
	Second	802	937	125,320	1.17	156
	Third	2,133	997	11,076	.47	5
	Total	3,197	2,235	173,551	.70	54

TABLE 2

SUMMARY OF RIBES ERADICATION ON NATIONAL PARKS, 1930-1942

National Park	Working	Acres Worked	Man-Days	Ribes Destroyed	Per Acre	
					Man-Days	Ribes
Mount Rainier	First	8,254	10,070	1,640,507	1.22	199
	Second	5,028	5,941	400,913	1.18	80
	Third	3,944	2,909	94,224	.74	24
	Total	17,226	18,920	2,135,644	1.10	124
Glacier	First	2,895	3,134	360,996	1.08	125
	Second	731	763	122,606	1.04	168
	Total	3,626	3,897	483,602	1.07	133
Total	First	11,149	13,204	2,001,503	1.18	180
	Second	5,759	6,704	523,519	1.16	91
	Third	3,944	2,909	94,224	.74	24
	Total	20,852	22,817	2,619,246	1.09	126

Table 3 shows the status of control work on the national parks in the Northwestern Region. The control area designated for Glacier, Yellowstone and Grand Teton is based on intensive surveys, but a final decision has not been made by the Park Service as to the areas which will be protected. In the case of Glacier and Grand Teton the acreage listed probably represents the maximum which might be included, for Yellowstone, final plans may include a greater acreage. For Rocky Mountain, the acreage is only an estimate based on an extensive survey.

TABLE 3

STATUS OF CONTROL ON NATIONAL PARKS

National Park	Acres in Control Area	Number Acres Worked			Acres Unworked
		First	Second	Third	
Mount Rainier	8,254	8,254	5,028	3,944	
Glacier	10,000	2,895	731		7,105
Yellowstone	12,900				12,900
Grand Teton	5,800				5,800
Rocky Mountain	7,000				7,000
Total	43,954	11,149	5,759	3,944	32,805

Statement of funds expended by the National Park Service for blister rust control work in 1942:

<u>National Park</u>	<u>Regular Funds</u>
Mount Rainier	\$ 8,328.73
Glacier	8,755.42
Total	\$17,084.15

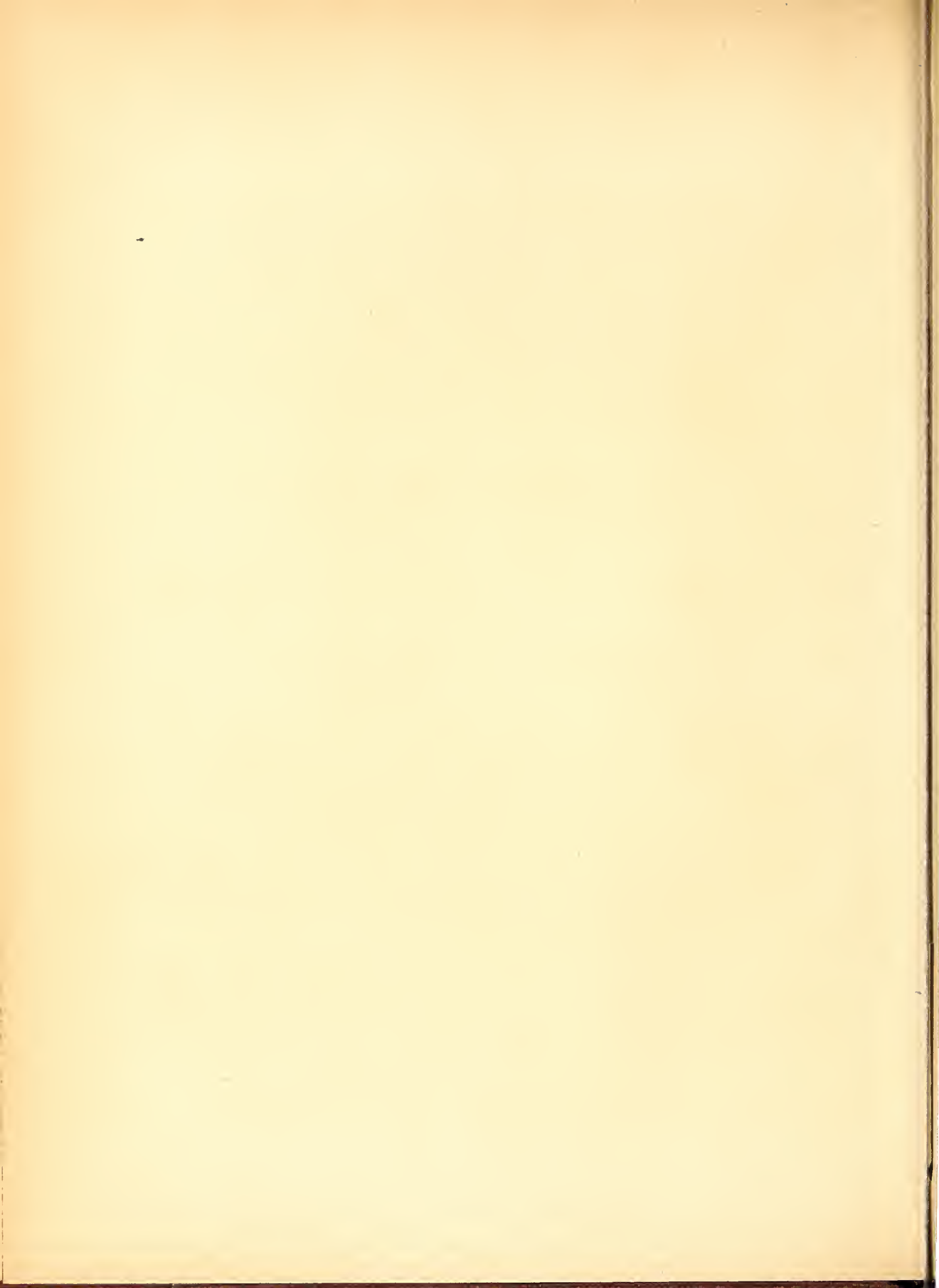
Statement of funds expended by the National Park Service for blister rust control work, not including cost of CCC work, during period 1930-1942:

<u>National Park</u>	<u>Regular Funds</u>
Mount Rainier	\$39,454.73
Glacier	8,755.42
Total	\$48,210.15

Conditions in national parks are very favorable for development of white pine blister rust. Occurrence of fog and high winds in the high elevations is an excellent medium by which the rust spreads between its hosts, ribes and pine. The continuance of this condition together with long periods of suitable temperatures results in longer distances of spread and rapid intensification of the rust once it is established. The principal species on some of the control areas are Pinus albicaulis and P. flexilis which are very susceptible and in most of the parks either Ribes petiolare or R. bracteosum, two highly susceptible species of ribes, is present.

Not only are conditions in the parks ideal for the rust, but the eradication of ribes is also difficult because of much steep and rough topography and because hand grubbing must be used almost entirely, without resorting to chemical and bulldozer methods for eradicating heavy concentrations of ribes where these methods could be employed.

For these reasons, control work must be started and completed well in advance of any serious establishment of blister rust, if protection of the white pine is to be secured.



BLISTER RUST CONTROL, INLAND EMPIRE, 1942

By

Herman E. Swanson
Senior Pathologist

This report summarizes the progress of blister rust control work on the commercial white pine area of the Inland Empire by consolidating the following operation reports:

1. Clearwater Operation
2. St. Joe Operation
3. Coeur d'Alene Operation
4. Kaniksu Operation
5. Montana Operation (Cabinet and Kootenai)
6. Mount Spokane Operation (no work performed in 1942)

The 1942 program included 34 Forest Service camps with approximately 1,464 workers for work on National Forest lands and 7 cooperative camps with approximately 290 workers administered by the Bureau of Entomology and Plant Quarantine for work on state and private lands. This was the first year since 1933 that no CCC or WPA crews were engaged on ribes eradication work. Progress of control work in 1942 was greatly retarded due to a critical labor shortage, with the result that only 46,709 acres were worked in the Inland Empire area.

A change was made in presenting data by eradication types in order to show the amount of work performed in newly established white pine reproduction. Age of the stand has a very important bearing on the control problem, particularly in the very young white pine. For this reason, future records will show ribes eradication work performed on areas burned or logged in each 10-year period starting with 1940. As protection is gradually being completed in the older reproduction and pole stands, future control work will become more and more confined to the protection of new white pine on cutover lands.

To reduce the size of the 1942 tabulations, certain data were combined. Data for open and dense type classifications within the same age class were combined. Information on density is still retained in the permanent record maps. Work performed under the NIRA (PWA) and ERA (WPA) programs was combined under one emergency relief work category. Similarly F-CCC and S-CCC work was combined under one heading of CCC. Since no blister rust work was performed by ERA or CCC crews in 1942, the 1941 annual report provides the permanent record of work performed under each of the emergency relief work programs.

Designations used in this report:

EQ	-Bureau of Entomology and Plant Quarantine
FS	-Forest Service
Reg.	-Program on regular appropriations
CCC	-Civilian Conservation Corps (F-CCC and S-CCC)
Emerg.	-Combines emergency relief work - NIRA (PWA) and ERA (WPA)
EQ-Coop.	-Cooperative program on state and private lands, financed by Bureau, State of Idaho, and Idaho Timber Protective Associations.

STATEMENT OF EXPENDITURES AND COSTS

The following tables show the expenditures made on the ribes eradication program. Effective man-day costs were exceptionally high in 1942 as a result of higher wages, high labor turnover and a great loss in work time caused by rain.

TABLE 1

EXPENDITURES BY APPROPRIATIONS IN INLAND EMPIRE, 1942

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 33,615.45
	Regular BLR-3-4	38,880.58
	Subtotal	72,496.03
State of Idaho Timber Protective Associations	State BLR-3-4	22,761.68
	Private BLR-3-4	15,440.78
	Subtotal	38,202.46
Forest Service	Regular BLR-4	488,821.13
Total		\$599,519.62

TABLE 2

CLASSIFIED EXPENDITURES IN INLAND EMPIRE, 1942

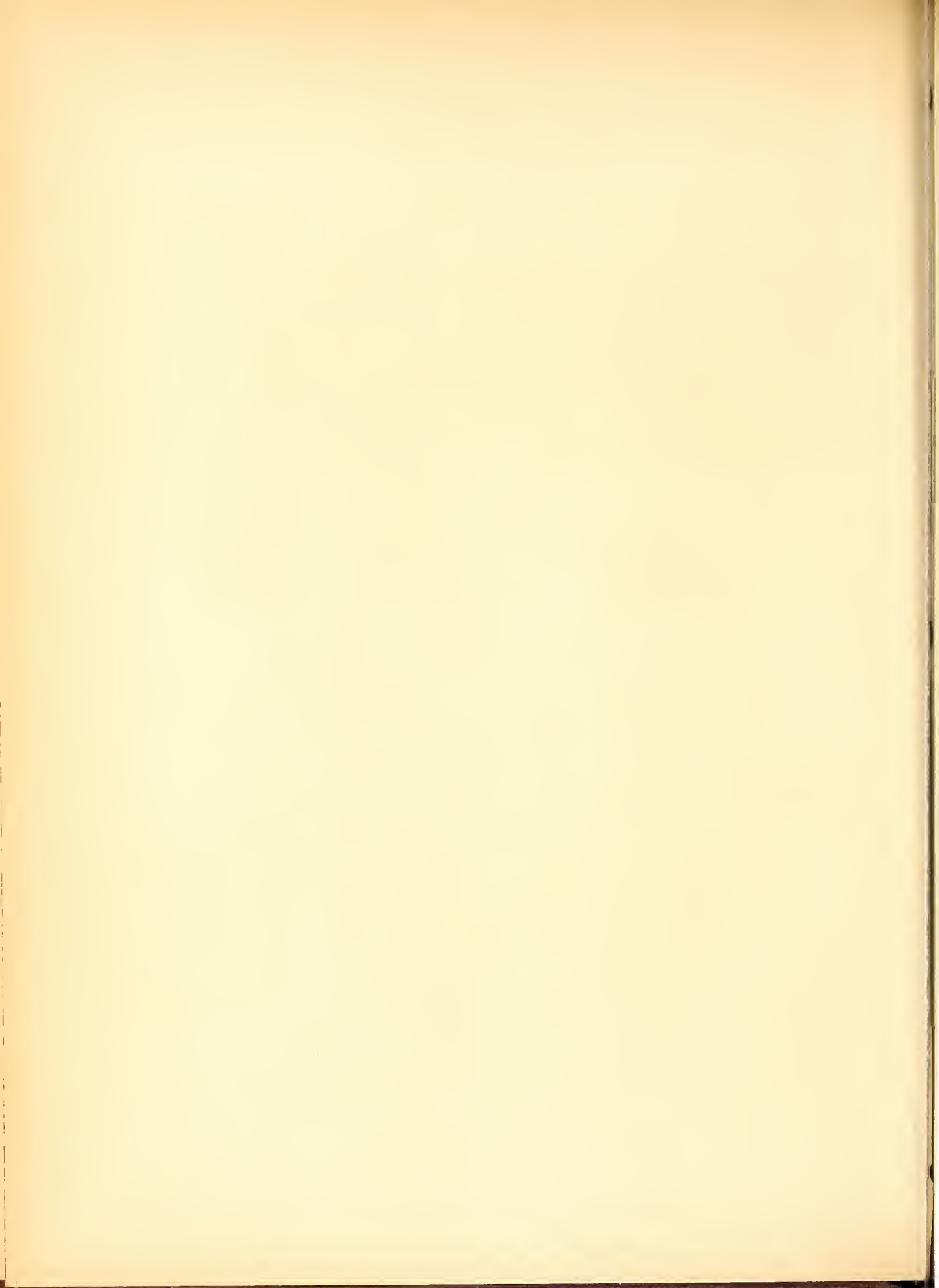
Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$25,086.02			\$ 25,086.02	\$ 20,741.71	\$ 45,827.73
Sal. temp. men	896.40	\$ 5,624.37	\$ 3,350.93	9,871.70	37,519.61	47,391.31
Wages, temp. labs.	2,080.93	21,620.07	34,773.49	58,474.49	316,031.87	374,506.36
Subs. supplies	1,170.89	10,180.47	78.04	11,429.40	88,997.53	100,426.93
Equipment	40.89	3.18		44.07	13,936.22	13,980.29
Travel & transp.	1,398.65	953.41		2,352.06	5,205.56	7,557.62
Chemicals					362.60	362.60
Twine					1,972.08	1,972.08
Other supplies	2,941.67	499.08		3,440.75	4,053.95	7,494.70
Total	\$33,615.45	\$38,880.58	\$38,202.46	\$110,698.49	\$488,821.13	\$599,519.62

TABLE 2A

DISTRIBUTION OF EXPENDITURES BY PROJECTS IN INLAND EMPIRE, 1942

Project	Expenditures	Number Effective Man-Days	Effective Man-Day Cost
Planning, Coordination and Technical Direction BEPQ Regular BLR-1-4	\$ 33,615.45		
Cooperative - State and Private Lands BEPQ Regular BLR-3-4	38,880.58	9,770	\$ 7.89
State of Idaho BLR-3-4	22,761.68		
Timber Protective Associations BLR-3-4	15,440.78		
Total	77,083.04		
National Forest Lands Forest Service Regular BLR-4	\$488,821.13	41,987	\$11.64

	<u>Bureau</u>	<u>Forest Service</u>
Number meals served	57,278	259,717
Average cost per meal	\$0.227	\$0.319
Pounds of twine	2,184	7,065
Pounds of chemical		32,071



SUMMARY OF RIBES ERADICATION, 1942
INLAND EMPIRE

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Total Gallons Spray
Cutover (1940-1942)		211	54	265	189	14,002	
Burn (1940-1942)		60		60	232	134,749	
Cutover (Prior 1940)	222	5,462	3,022	8,706	8,927	1,618,810	
Burn (Prior 1940)	270	782		1,052	3,149	475,315	
Reproduction	4,185	9,940	4,622	18,747	22,915	1,704,643	
Pole	1,527	11,130	1,541	14,198	10,829	878,404	
Mature	116	757		873	313	42,741	
Brush		92	115	207	76	2,312	
Subalpine		60		60	12	12,019	
All Upland	6,320	28,494	9,354	44,168	46,642	4,882,995	
Stream (Hand)	401	437	1,206	2,044	2,535	409,030	
Stream (Chemical)	378	119	133	630	894	71,835	23,945
Stream (Zone)	164	333		497	1,686	118,835	
All Stream	565	770	1,206	2,541	5,115	599,700	
All Types	6,885	29,264	10,560	46,709	51,757	5,482,695	

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man- Days	Ribes	Gallons Spray
Cutover (Prior 1940)	222	452	256,746		2.04	1,157	
Burn (Prior 1940)	270	1,046	274,709		3.87	1,017	
Reproduction	4,185	6,984	1,150,768		1.67	275	
Pole	1,527	2,510	335,611		1.64	220	
Mature	116	36	2,758		.31	24	
All Upland	6,320	11,028	2,020,592		1.74	320	
Stream (Hand)	401	1,199	297,106		2.99	741	
Stream (Chemical)	378	691	63,837	21,279	1.83	169	56
Stream (Zone)	164	1,045	85,569		6.37	522	
All Stream	565	2,935	446,512		5.19	790	
All Types	6,885	13,963	2,467,104		2.03	358	

TABLE 3B - SECOND WORKING

Cutover (1940-1942)	211	147	6,191		.70	29	
Burn (1940-1942)	60	232	134,749		3.87	2,246	
Cutover (Prior 1940)	5,462	5,369	1,232,245		.98	226	
Burn (Prior 1940)	782	2,103	200,606		2.69	257	
Reproduction	9,940	9,707	407,733		.98	41	
Pole	11,130	7,426	513,214		.67	46	
Mature	757	277	39,983		.37	53	
Brush	92	13	544		.14	6	
Subalpine	60	12	12,019		.20	200	
All Upland	28,494	25,286	2,547,284		.89	89	
Stream (Hand)	437	622	51,242		1.42	117	
Stream (Chemical)	119	145	5,118	1,706	1.22	43	14
Stream (Zone)	333	641	33,266		1.92	100	
All Stream	770	1,408	89,626		1.83	116	
All Types	29,264	26,694	2,636,910		.91	90	

TABLE 3C - THIRD WORKING

Cutover (1940-1942)	54	42	7,811		.78	145	
Cutover (Prior 1940)	3,022	3,106	129,819		1.03	43	
Reproduction	4,622	6,224	146,142		1.35	32	
Pole	1,541	893	29,579		.58	19	
Brush	115	63	1,768		.55	15	
All Upland	9,354	10,328	315,119		1.10	34	
Stream (Hand)	1,206	714	60,682		.59	50	
Stream (Chemical)	133	58	2,880	960	.44	22	7
All Stream	1,206	772	63,562		.64	53	
All Types	10,560	11,100	378,681		1.05	36	



TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1942
INLAND EMPIRE

State	Working	Class	Acres	Effective Men-Days	Total Ribes	Gallons Spray	Per Acre Basis Men-Days	Ribes
Idaho	First	Eq-Coop.	269	525	270,982		1.95	1,007
		FS-Reg.	4,717	9,174	1,177,252	21,279	1.94	250
		Total	4,986	9,699	1,448,134	21,279	1.95	250
	Second	Eq-Coop.	9,309	5,892	596,931		.63	64
		FS-Reg.	19,201	19,240	1,871,114	1,106	1.06	103
		Total	27,510	25,132	2,468,045	1,106	.91	90
	Third	Eq-Coop.	3,393	3,353	147,913		.99	44
		FS-Reg.	6,095	7,064	171,137	960	1.16	23
		Total	9,488	10,417	319,050	960	1.10	34
	All Workings	Eq-Coop.	12,971	9,770	1,015,726		.75	78
		FS-Reg.	29,013	35,478	3,219,503	22,345	1.22	111
		Total	41,984	45,248	4,235,229	22,345	1.08	101
Washington	First	FS-Reg.	1,397	2,325	684,757		1.68	494
	Second	FS-Reg.	798	429	30,570		.54	38
	All Workings	FS-Reg.	2,185	2,754	715,327		1.26	327
Montana	First	FS-Reg.	512	1,939	334,213		3.79	653
	Second	FS-Reg.	956	1,133	138,295	600	1.19	145
	Third	FS-Reg.	1,072	683	59,631		.64	56
	All Workings	FS-Reg.	2,540	3,755	532,139	600	1.48	210
		Eq-Coop.	269	525	270,982		1.95	1,007
Total	First	FS-Reg.	6,616	13,438	2,196,222	21,279	2.03	332
		Total	6,885	13,963	2,467,104	21,279	2.03	359
		Eq-Coop.	9,309	5,892	596,931		.63	64
	Second	FS-Reg.	19,955	20,902	2,039,979	1,706	1.04	102
		Total	29,264	26,694	2,636,910	1,706	.91	90
		Eq-Coop.	3,393	3,353	147,913		.99	44
	Third	FS-Reg.	7,167	7,747	230,768	960	1.09	32
		Total	10,560	11,100	378,681	960	1.05	36
		Eq-Coop.	12,971	9,770	1,015,726		.75	78
	All Workings	FS-Reg.	33,738	41,987	4,466,969	22,945	1.24	132
		Total	46,709	51,757	5,482,695	22,945	1.11	117

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1942
INLAND EMPIRE

State	Working	Number of Acres Worked																	
		By Forest Service					By Bureau of Entomology and Plant Quarantine					Total							
		National Forest	Public Domain	State	Private	Total	National Forest	Public Domain	State	Private	Total	National Forest	Public Domain	Total	State	Private	Total	Total	
Idaho	First	4,627			90	4,717			269		269	4,627		4,627	269	90	359	4,986	
	Second	13,644	185	1,393	2,999	19,201	2,155	60	3,743	3,346	9,309	15,799	245	16,044	5,131	6,335	11,466	27,510	
	Third	4,124	60	232	1,579	6,095	120		392	2,891	3,393	4,244	60	4,304	624	4,560	5,194	9,488	
	Total	22,395	245	1,615	4,759	29,013	2,275	60	4,409	6,227	12,971	24,670	305	24,975	6,024	10,985	17,509	41,984	
Washington	First	1,397				1,397						1,397		1,397				1,397	
	Second	798				798						798		798				798	
	Total	2,185				2,185						2,185		2,185				2,185	
Montana	First	512				512						512		512				512	
	Second	890			76	956						890		890		76	76	956	
	Third	656			416	1,072						656		656		416	416	1,072	
	Total	2,048			492	2,540						2,048		2,048		492	492	2,540	
Total	First	6,526			90	6,616			269		269	6,526		6,526	269	90	359	6,885	
	Second	15,322	185	1,393	3,065	19,955	2,155	60	3,743	3,346	9,309	17,477	245	17,722	5,131	6,411	11,542	29,264	
	Third	4,780	60	232	2,035	7,167	120		392	2,891	3,393	4,900	60	4,960	624	4,976	5,600	10,560	
	Total	26,628	245	1,615	5,250	33,738	2,275	60	4,409	6,227	12,971	28,503	305	28,808	6,024	11,477	17,501	46,709	

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1942
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes by Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	
First	Cutover (Prior 1940)	222	42,853	213,893					256,746
	Burn (Prior 1940)	270	216,466	59,243					274,709
	Reproduction	4,135	416,676	734,076	14	2			1,150,768
	Pole	1,527	179,595	156,016					335,611
	Mature	116	2,642	116					2,758
	All Upland	6,320	858,232	1,162,344	14	2			2,020,592
	Stream	565	370,353	2,465	63,837	9,857			446,512
	All Types	6,885	1,228,585	1,164,909	63,851	9,859			2,467,104
Second	Cutover (1940-1942)	211	4,089	2,102					6,191
	Burn (1940-1942)	60	32,163	102,531					134,749
	Cutover (Prior 1940)	5,462	349,931	876,713	960	312	4,379		1,232,245
	Burn (Prior 1940)	782	148,580	52,026					200,606
	Reproduction	9,940	263,579	131,517	465	7,172			407,733
	Pole	11,130	203,099	306,164	2,740	1,211			513,214
	Mature	757	16,401	23,582					39,983
	Brush	92	529	15					544
	Subalpine	60	8,124	3,895					12,019
	All Upland	23,494	1,031,550	1,498,595	4,065	8,695	4,379		2,547,234
	Stream	770	63,159	4,769	9,876	13,552		1,270	89,626
	All Types	23,264	1,091,709	1,503,364	13,941	22,247	4,379	1,270	2,636,910
Third	Cutover (1940-1942)	54	6,219	1,592					7,811
	Cutover (Prior 1940)	3,022	41,758	82,754	5,307				129,819
	Reproduction	4,622	89,721	54,300	660	1,347		114	146,142
	Pole	1,541	11,604	17,830	4	141			29,579
	Brush	115	718	1,026		24			1,763
	All Upland	9,354	150,020	157,502	5,971	1,512		114	315,119
	Stream	1,206	24,072	379	28,163	2,296		8,652	63,562
	All Types	10,560	174,092	157,881	34,134	3,808		8,766	378,681
All Workings	Cutover (1940-1942)	265	10,309	3,694					14,002
	Burn (1940-1942)	60	32,163	102,581					134,749
	Cutover (Prior 1940)	8,706	434,592	1,173,360	6,167	312	4,379		1,618,810
	Burn (Prior 1940)	1,052	365,046	110,269					475,315
	Reproduction	18,747	774,976	919,893	1,139	8,521		114	1,704,643
	Pole	14,198	394,298	480,010	2,744	1,352			873,404
	Mature	873	19,043	23,698					42,741
	Brush	207	1,247	1,041		24			2,312
	Subalpine	60	8,124	3,895					12,019
	All Upland	44,169	2,039,802	2,818,441	10,050	10,209	4,379	114	4,832,995
	Stream	2,541	454,584	7,613	101,376	25,705		9,922	599,700
	All Types	46,709	2,494,386	2,826,054	111,926	35,914	4,379	10,036	5,432,695

SUMMARY OF RIBES ERADICATION, 1923-1942
INLAND EMPIRE

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Cutover (1940-1942)		211	54	265	189	14,002	
Burn (1940-1942)		60		60	232	134,749	
Cutover (Prior 1940)	49,539	48,648	13,452	111,639	121,496	33,545,840	
Burn (Prior 1940)	8,181	1,613		9,794	10,770	3,842,819	
Reproduction	589,592	157,908	22,870	770,370	873,691	202,763,452	
Pole	356,064	76,376	5,353	437,793	198,620	32,569,399	
Mature	722,397	44,061	2,258	768,716	337,615	70,963,640	
Brush	25,041	2,354	459	27,854	27,080	5,105,948	
Subalpine	3,255	291	88	3,634	2,363	491,592	
Meadow-Field	2,569	10		2,579	152	12,203	
All Upland	1,756,638	331,532	44,534	2,132,704	1,572,198	349,443,544	
Stream (Hand)	118,832	47,084	12,876	178,792	296,542	69,331,314	
Stream (Chemical)	22,916	9,238	1,249	33,403	68,657	5,436,083	1,781,156
Stream (Mechanical)	3,728	155	40	3,923	32,288	2,231,390	
Stream (Zone)		4,476		4,448	4,954	626,262	
All Stream	122,887	51,715	12,876	187,478	402,441	77,625,049	
All Types	1,879,525	383,247	57,410	2,320,182	1,974,639	427,068,693	

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man- Days	Ribes	Gallons Spray
Cutover (Prior 1940)	49,539	48,569	16,815,656		.98	339	
Burn (Prior 1940)	8,181	7,156	2,894,183		.87	354	
Reproduction	589,592	656,206	180,055,529		1.11	305	
Pole	356,064	151,308	27,829,698		.42	78	
Mature	722,397	307,774	67,217,507		.43	93	
Brush	25,041	24,565	4,856,832		.98	194	
Subalpine	3,255	2,170	463,787		.67	142	
Meadow-Field	2,569	151	12,131		.06	5	
All Upland	1,756,638	1,197,899	300,145,323		.68	171	
Stream (Hand)	118,832	219,456	56,981,569		1.95	480	
Stream (Chemical)	22,916	54,386	4,639,290	1,515,495	2.37	202	66
Stream (Mechanical)	3,728	30,392	2,147,593		8.15	576	
Stream (Zone)		372	1,315	141,227	3.53	390	
All Stream	122,887	305,549	63,909,779		2.43	520	
All Types	1,879,525	1,503,443	364,055,102		.80	194	

TABLE 7B - SECOND WORKING

Cutover (1940-1942)	211	147	6,191		.70	29	
Burn (1940-1942)	60	232	134,749		3.87	2,246	
Cutover (Prior 1940)	48,648	56,268	15,109,092		1.16	311	
Burn (Prior 1940)	1,613	3,614	948,636		2.24	588	
Reproduction	157,908	188,119	20,525,504		1.13	130	
Pole	76,376	43,688	4,360,319		.57	57	
Mature	44,061	28,309	3,542,293		.64	80	
Brush	2,354	2,226	228,442		.95	97	
Subalpine	291	154	22,457		.53	77	
Meadow-Field	10	1	72		.10	7	
All Upland	331,532	322,758	44,877,755		.97	135	
Stream (Hand)	47,084	61,765	10,317,228		1.31	219	
Stream (Chemical)	9,238	13,206	725,492	241,894	1.43	79	26
Stream (Mechanical)	155	1,254	63,794		8.09	412	
Stream (Zone)	4,476	3,639	485,035		.91	108	
All Stream	51,715	79,864	11,591,549		1.54	224	
All Types	383,247	402,622	56,469,304		1.05	147	

TABLE 7C - THIRD WORKING

Cutover (1940-1942)	54	42	7,811		.78	145	
Cutover (Prior 1940)	13,452	16,649	1,621,092		1.24	121	
Reproduction	22,870	29,366	2,182,419		1.28	95	
Pole	5,353	3,624	379,382		.68	71	
Mature	2,258	1,532	203,840		.62	90	
Brush	459	289	20,674		.63	45	
Subalpine	88	39	5,348		.44	61	
All Upland	44,534	51,541	4,420,566		1.16	99	
Stream (Hand)	12,876	15,321	2,032,420		1.19	158	
Stream (Chemical)	1,249	1,065	71,301	23,767	.85	57	19
Stream (Mechanical)	40	642	20,000		16.05	500	
All Stream	12,876	17,028	2,123,721		1.32	165	
All Types	57,410	68,569	6,544,287		1.19	114	

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923-1942
INLAND EMPIRE

State	Working	Class	Acres	Effective Men-Days	Total Ribes	Gallone Spray	Per Acre Beebe Men-Days	Ribee
Idaho	First	Eq-Reg.	48,984	20,468	5,042,300	79,864	.42	103
		Eq-Coop.	152,497	61,800	16,655,194	175,594	.41	109
		Eq-Emerg.	397,953	290,528	77,495,446	152,499	.73	195
		FS-Reg.	215,961	213,050	58,085,523	385,805	.99	269
		FS-Emerg.	305,020	194,845	54,142,291	113,170	.64	178
		CCC	517,106	540,911	109,366,941	550,759	1.05	211
		Total	1,537,521	1,321,602	320,787,595	1,457,670	.81	196
	Second	Eq-Coop.	21,831	15,310	1,549,472	11,078	.70	71
		Eq-Emerg.	104,562	98,803	17,869,395	56,311	.94	171
		FS-Reg.	125,938	127,988	15,874,698	51,771	1.02	126
		FS-Emerg.	31,164	20,079	2,298,185	10,051	.64	74
		CCC	65,117	105,410	13,052,710	101,537	1.52	200
		Total	348,612	368,590	50,644,450	230,748	1.06	145
	Third	Eq-Coop.	5,944	5,969	605,771		1.00	102
		Eq-Emerg.	12,427	14,769	1,509,739	5,135	1.19	121
		FS-Reg.	20,620	24,316	1,863,719	7,809	1.18	90
		FS-Emerg.	1,695	1,316	196,299	2,270	.78	116
		CCC	8,191	14,372	1,309,699	5,008	1.75	160
		Total	48,867	60,742	5,485,215	20,222	1.24	112
	All Workings	Eq-Reg.	48,984	20,468	5,042,300	79,864	.42	103
		Eq-Coop.	180,272	83,079	18,810,437	186,662	.46	104
		Eq-Emerg.	514,942	404,100	96,874,569	213,935	.78	188
		FS-Reg.	362,519	365,354	75,823,940	445,385	1.01	209
		FS-Emerg.	337,869	216,240	56,636,775	125,491	.64	168
		CCC	590,414	661,693	123,729,240	657,303	1.12	210
		Total	2,035,000	1,750,934	376,917,251	1,708,640	.86	185
Washington	First	Eq-Emerg.	48,156	46,892	14,422,701		.97	299
		FS-Reg.	13,951	13,590	5,376,625		.97	395
		FS-Emerg.	34,417	12,708	3,858,496		.37	112
		CCC	19,741	21,426	3,254,404		1.09	165
		Total	116,265	94,616	26,912,226		.61	231
	Second	Eq-Emerg.	11,920	12,212	2,634,166		1.02	221
		FS-Reg.	8,880	4,978	1,391,290		.56	157
		FS-Emerg.	1,949	1,678	154,764		.86	79
		CCC	2,597	3,279	232,829		1.27	90
		Total	25,336	22,147	4,413,039		.87	174
	Third	Eq-Emerg.	4,681	4,036	768,915		.86	164
		FS-Reg.	633	216	75,265		.34	119
		Total	5,314	4,252	844,180		.80	159
	All Workings	Eq-Emerg.	64,757	63,140	17,825,782		.98	275
		FS-Reg.	23,464	18,794	5,843,170		.80	292
		FS-Emerg.	36,366	14,396	4,013,260		.40	110
		CCC	22,329	24,705	2,497,233		1.11	156
		Total	146,915	121,015	32,169,445		.82	219
Montana	First	Eq-Reg.	1,392	2,315	462,300	30,665	1.67	324
		Eq-Emerg.	64,086	28,413	5,450,738	1,330	.44	85
		FS-Reg.	13,036	13,331	1,987,742	2,452	1.02	152
		FS-Emerg.	33,462	33,088	7,157,633	20,598	.99	214
		CCC	13,772	10,083	1,296,868	2,780	.73	94
		Total	125,739	87,230	16,355,281	57,825	.69	130
	Second	Eq-Reg.	619	980	299,410	4,130	1.58	484
		Eq-Emerg.	1,342	1,597	265,637		1.19	198
		FS-Reg.	4,560	4,670	479,320	5,976	1.02	105
		FS-Emerg.	2,100	2,464	204,021	1,040	1.17	97
		CCC	678	2,174	163,427		3.21	241
		Total	9,299	11,895	1,411,815	11,146	1.28	152
	Third	Eq-Emerg.	648	777	59,040		1.20	91
		FS-Reg.	2,406	2,547	138,058		1.06	57
		FS-Emerg.	150	68	6,069		.45	40
		CCC	25	183	11,714	3,545	7.32	459
		Total	3,229	3,575	214,891	3,545	1.11	67
	All Workings	Eq-Reg.	2,002	3,295	761,710	34,795	1.65	380
		Eq-Emerg.	66,076	30,787	5,775,415	1,330	.47	87
		FS-Reg.	20,002	20,548	2,605,130	8,428	1.03	130
		FS-Emerg.	35,712	35,620	7,367,723	21,638	1.00	206
		CCC	14,475	12,440	1,472,009	6,325	.86	102
		Total	138,267	102,690	17,981,987	72,516	.74	130
Idaho Washington Montana	First	Eq-Reg.	50,367	22,783	5,504,600	110,529	.45	109
		Eq-Coop.	152,497	61,800	16,655,194	175,594	.41	109
		Eq-Emerg.	510,195	365,833	97,368,895	183,819	.72	191
		FS-Reg.	242,948	239,971	65,449,890	388,257	.99	269
		FS-Emerg.	372,899	240,641	65,158,420	133,768	.65	175
		CCC	550,619	572,420	113,918,113	553,538	1.04	207
		Total	1,879,525	1,503,448	364,055,102	1,515,495	.80	194
	Second	Eq-Reg.	619	980	299,410	4,130	1.58	484
		Eq-Coop.	21,831	15,310	1,549,472	11,078	.70	71
		Eq-Emerg.	117,824	112,612	20,769,188	56,311	.96	176
		FS-Reg.	139,378	137,636	17,745,298	57,747	.99	127
		FS-Emerg.	35,213	24,221	2,656,970	11,091	.69	75
		CCC	68,382	111,863	13,448,966	101,537	1.64	197
		Total	393,247	402,622	56,469,304	241,894	1.05	147
	Third	Eq-Coop.	5,944	5,969	605,771		1.00	102
		Eq-Emerg.	17,756	19,582	2,337,693	5,135	1.10	132
		FS-Reg.	23,659	27,079	2,077,052	7,809	1.14	88
		FS-Emerg.	1,835	1,384	202,368	2,270	.75	110
		CCC	8,216	14,555	1,321,433	8,553	1.77	161
		Total	57,410	68,569	6,544,287	23,767	1.19	114
	All Workings	Eq-Reg.	50,986	23,763	5,804,010	114,559	.47	114
		Eq-Coop.	180,272	83,079	18,810,437	186,662	.46	104
		Eq-Emerg.	645,775	498,027	120,475,766	215,265	.77	187
		FS-Reg.	405,985	404,696	85,272,240	453,813	1.00	211
		FS-Emerg.	409,947	266,246	68,017,758	147,129	.65	166
		CCC	627,217	698,838	128,698,492	653,628	1.11	205
		Total	2,320,182	1,974,639	427,068,693	1,781,158	.95	184

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1942
INLAND EMPIRE

State	Working	Number of Acres Worked						
		Federal			Other			Total
		National Forest	Public Domain	Total	State	Private	Total	
Idaho	First	867,326	16,482	883,808	264,018	489,695	753,713	1,637,521
	Second	196,344	5,570	201,914	48,097	98,601	146,698	348,612
	Third	23,648	202	23,850	7,868	17,149	25,017	48,867
	Total	1,087,318	22,254	1,109,572	319,983	605,445	925,428	2,035,000
Washington	First	69,440	315	69,755	6,832	39,678	46,510	116,265
	Second	13,748	60	13,808	3,935	7,593	11,528	25,336
	Third	633		633	2,114	2,567	4,681	5,314
	Total	83,821	375	84,196	12,881	49,838	62,719	146,915
Montana	First	104,266	40	104,306	576	20,857	21,433	125,739
	Second	7,256		7,256		2,043	2,043	9,299
	Third	1,553		1,553		1,676	1,676	3,229
	Total	113,075	40	113,115	576	24,576	25,152	138,267
Total	First	1,041,032	16,837	1,057,869	271,426	550,230	821,656	1,879,525
	Second	217,348	5,630	222,978	52,032	108,237	160,269	383,247
	Third	25,834	202	26,036	9,982	21,392	31,374	57,410
	Total	1,284,214	22,669	1,306,883	333,440	679,859	1,013,299	2,320,182

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1942
INLAND EMPIRE

State	Ownership Class	Number of Acres			Acres on Which Working is Deferred	Total Acres White Pine
		Worked	Unworked	Total		
Idaho	National Forest	867,326	206,310	1,073,636	56,454	1,130,090
	Public Domain	16,482	14,068	30,550	1,040	31,590
	Subtotal Federal	883,808	220,378	1,104,186	57,494	1,161,680
	State	264,018	48,822	312,840	32,110	344,950
	Private	489,695	215,398	705,093	95,932	801,025
	Subtotal Other	753,713	264,220	1,017,933	128,042	1,145,975
	Total	1,637,521	484,598	2,122,119	185,536	2,307,655
Washington	National Forest	69,440	29,870	99,310		99,310
	Public Domain	315		315		315
	Subtotal Federal	69,755	29,870	99,625		99,625
	State	6,832	3,018	9,850		9,850
	Private	39,678	11,942	51,620		51,620
	Subtotal Other	46,510	14,960	61,470		61,470
	Total	116,265	44,830	161,095		161,095
Montana	National Forest	104,266	42,149	146,415	17,468	163,883
	Public Domain	40		40		40
	Subtotal Federal	104,306	42,149	146,455	17,468	163,923
	State	576	234	810		810
	Private	20,857	12,660	33,517	2,490	36,007
	Subtotal Other	21,433	12,894	34,327	2,490	36,817
	Total	125,739	55,043	180,782	19,958	200,740
Total	National Forest	1,041,032	278,329	1,319,361	73,922	1,393,283
	Public Domain	16,837	14,068	30,905	1,040	31,945
	Subtotal Federal	1,057,869	292,397	1,350,266	74,962	1,425,228
	State	271,426	52,074	323,500	32,110	355,610
	Private	550,230	240,000	790,230	98,422	888,652
	Subtotal Other	821,656	292,074	1,113,730	130,532	1,244,262
	Total	1,879,525	584,471	2,463,996	205,494	2,669,490



TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1922-1942
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes by Species										Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inermis	Ribes irriguum	Ribes coloradense	Ribes triste	Ribes acerifolium			
First	Cutover (Prior 1940)	49,539	5,911,364	10,721,291	43,873	90,333	38,795					16,815,656	
	Burn (Prior 1940)	9,191	789,491	2,077,346	568	17,486	9,292					2,894,193	
	Reproduction	599,592	49,743,618	128,408,666	204,815	1,189,251	504,579	3,455	1,145			180,055,529	
	Pole	356,064	14,201,294	12,939,362	65,233	385,988	233,465		462	3,914		27,829,698	
	Mature	722,397	43,886,917	22,213,770	226,309	403,334	475,817	7,257	26	2,027		67,217,507	
	Brush	25,041	1,522,994	3,196,630	19,257	97,116	20,855					4,856,832	
	Subalpine	3,255	326,851	136,917								463,787	
	Meadow-Field	2,569	5,010			7,121						12,131	
	All Upland	1,756,638	116,387,539	179,703,982	560,055	2,192,678	1,282,783	10,712	1,633	5,941	300,145,323		
	Stream	122,337	42,285,133	2,006,928	6,376,239	13,052,565	116,220	31,905	21,255	19,584	63,909,779		
Second	All Types	1,879,525	158,672,672	191,710,810	6,936,344	15,245,243	1,399,003	42,617	22,888	25,525	354,055,102		
	Cutover (1940-1942)	211	4,089	2,102								6,191	
	Burn (1940-1942)	60	32,168	102,581								137,749	
	Cutover (Prior 1940)	48,648	3,585,566	11,405,306	78,335	24,729	15,156					15,109,092	
	Burn (Prior 1940)	1,613	430,471	512,718	5,447							948,536	
	Reproduction	157,908	7,256,654	13,077,868	51,975	105,291	31,115		2,591			20,525,504	
	Pole	76,376	2,227,068	2,065,775	25,908	39,923	1,740					4,560,319	
	Mature	44,061	1,921,971	1,552,252	16,546	15,098	36,159		267			3,542,293	
	Brush	2,554	69,103	158,464		875						228,442	
	Subalpine	231	13,555	8,902								22,457	
Third	Meadow-Field	10	72									72	
	All Upland	231,532	15,540,727	23,895,963	178,111	195,921	84,170		2,358			44,877,755	
	Stream	51,715	6,700,600	780,591	1,953,866	1,969,331	32,190		155,991			11,591,549	
	All Types	283,247	22,241,227	29,666,549	2,131,977	2,154,252	116,360		159,839			56,469,304	
	Cutover (1940-1942)	54	6,219	1,592								7,811	
	Cutover (Prior 1940)	13,452	705,359	887,942	19,826	7,822	143					1,621,092	
	Reproduction	22,870	901,723	1,261,423	8,386	10,559	214		114			2,182,419	
	Pole	5,353	203,017	176,123	42	194	6					379,382	
	Mature	2,258	149,443	52,661	8		1,728					203,840	
	Brush	459	6,020	14,630		24						20,674	
All Workings	Subalpine	88	2,510	2,839								5,348	
	All Upland	44,534	1,974,291	2,397,209	28,262	19,599	2,091		114			4,420,556	
	Stream	12,876	1,032,971	31,116	556,761	494,749			18,124			2,123,721	
	All Types	57,410	3,007,262	2,428,325	585,023	503,348	2,091		18,238			6,544,287	
	Cutover (1940-1942)	265	10,308	3,694								14,002	
	Burn (1940-1942)	60	32,168	102,581								134,749	
	Cutover (Prior 1940)	111,639	10,202,289	23,024,539	142,034	122,884	54,094					33,545,840	
	Burn (Prior 1940)	9,794	1,219,962	2,590,064	6,015	17,486	9,292					3,842,819	
	Reproduction	770,370	57,902,005	142,747,957	265,176	1,305,101	535,908	3,455	7,350			202,763,452	
	Pole	437,793	16,621,279	15,181,260	91,083	426,090	235,211		462	3,914		32,563,599	
All Workings	Mature	768,716	45,958,331	23,818,683	242,863	420,482	515,704	7,257	293			70,963,640	
	Brush	27,854	1,593,117	3,369,724	19,257	98,015	20,855					5,105,948	
	Subalpine	2,634	342,916	148,657		19						491,592	
	Meadow-Field	2,579	5,092			7,121						12,131	
All Workings	All Upland	2,182,704	132,902,557	210,997,159	766,428	2,397,199	1,363,044	10,712	4,605	5,941	300,145,323	449,445,644	
	Stream	187,478	50,013,704	2,813,525	8,886,916	15,505,645	143,410	31,905	195,360	19,584	63,909,779	77,625,049	
	All Types	2,370,182	182,916,261	213,810,684	9,653,344	17,902,843	1,517,454	42,617	199,965	25,525	354,055,102	427,069,392	

BLISTER RUST CONTROL WORK, CLEARWATER OPERATION, 1942

By

F. J. Heinrich, Associate Pathologist
David Kyle, Assistant Forester, U. S. Forest Service
H. J. Faulkner, Chief Scientific Aid

INTRODUCTION

When blister rust control measures were started on the Clearwater operation in 1929, it was estimated that white pine blister rust had to be brought under control within 10 years or serious damage would take place in the white pine stands. The outlined program could not be followed due to insufficient allotments and as a result the disease spread throughout the control area causing limited damage to some of the stands.

Since 1936 the size of the blister rust control program has steadily decreased through the gradual reduction in emergency relief work programs, WPA and CCC, which were entirely lost to blister rust control work in 1942. Fortunately, some of the loss was made up through the increase in regular federal funds for blister rust control and the renewal of financial contributions for the work in 1941 by the Clearwater Timber Protective Association. The planned program for 1942 represented an increase over that of 1941, but this did not materialize. In the case of the cooperative program on state and private lands there was a sufficient increase to counterbalance the loss of the WPA, but not the loss of the CCC. The labor shortage prevented the program on national forest lands from reaching its full quota.

As compared with 8,646 acres worked in 1941, there were 7,080 acres covered during the 1942 season, and yet the work in 1942 was done with an average of 1.43 man-days and 239 ribes per acre against 1.51 man-days and 123 ribes per acre in 1941. Through 1942, initial working has been performed on 395,006 acres, second working on 108,577 acres and third working on 13,640 acres.

ORGANIZATION AND ADMINISTRATION

Blister rust control activities were handled in accordance with a memorandum of understanding between the Bureau of Entomology and Plant Quarantine and the U. S. Forest Service, and between the Bureau and the state of Idaho. The Bureau personnel gave technical assistance to the Forest Service camps and had complete charge of the work performed by the cooperative camps on state and private lands. Splendid cooperation was received from the U. S. Forest Service, Clearwater Timber Protective Association, State of Idaho, Potlatch Forests, Incorporated, and other cooperating agencies and individuals.

Field headquarters were established at Pierce, Idaho, on May 1. This served as the operation headquarters for all blister rust control work and as a warehouse and supply base for all Bureau camps.

Blister rust control work on the Forest Service lands was discontinued as a special project handled by staff specialists and was turned over to the district rangers, and they were responsible for the work performed on their districts. The original plans called for an alternate ranger with several years of blister rust experience to handle the field work. Due to uncontrollable circumstances it was not possible to follow this plan throughout the season. Service and supply was moved to the Forest Service warehouse in order to coordinate truck transportation for all forest activities.

The blister rust control field organization was as follows:

Bureau of Entomology and Plant Quarantine

U. S. Forest Service

Fred J. Heinrich, Technical Supervisor
Harry J. Faulkner, Assistant Operation Supervisor in charge of checking

David Kyle, Forest Officer

<u>Program</u>	<u>Number Camps</u>	<u>Number Workers</u>	<u>Number Checkers</u>
EQ-Cooperative	3	90	1
FS-Regular	5	236	1
Total number employed on blister rust control - 328			

The first Forest Service camp was established on May 5, at the Upper Beaver Creek plantation. The last camp moved from the field on October 1. On May 25 the first Bureau camp was established near Pierce, Idaho, and continued until field work stopped September 10.

In general, the crewmen were the youngest that have been employed in regular camps. Many of the boys had never been engaged in any type of work before. This was their first job, which necessitated continuous training throughout the season. They had to be taught how to live in camp, how to care for themselves in the woods and how to perform the assigned duties in a safe and progressive manner. This created a problem that was further amplified by the fact that very few trained men were available as a nucleus around which to build the field crews. Out of a total of twelve trained supervisory personnel, only two were available throughout the 1942 field season. By continuous training and careful selection some very good crews were developed by the end of the field season. Most of the boys were of high school age, and many of them left the job to return to school about August 15.

The season was quite similar to 1941 in that rains were encountered almost continuously during the first two months. In June alone there were 16 days of recorded rainfall.

All blister rust crews were given intensive fire training and were figured in the general fire plan both with the Forest Service and the Clearwater Timber Protective Association. The fire situation on the Clearwater Forest during the past season was not serious; however, approximately three weeks were lost by the Forest Service crews when they were dispatched to the Idaho and Payette Forests during the last of August and the first part of September. The crews from the cooperative camps lost only a few days due to fire.

A two-day field conference was held for the Forest Service personnel at the close of the field season. The meeting was attended by the supervisory staff, rangers, and alternate rangers. All phases of the blister rust control activities were covered, with part of the time being spent in the field inspecting the work and discussing control problems.

LOCATION AND DESCRIPTION OF AREAS

The Bureau camps worked entirely on cutover areas in the vicinity of Pierce and Headquarters, Idaho. One camp was located near the Clearwater Timber Protective Association, and it worked areas in the Reeds and Deer Creek drainages. All of this was second and third working and consisted primarily of cleaning up areas which had previously supported a heavy population of ribes. The men in this camp were housed in a railroad car camp loaned by the Potlatch Forests, Incorporated.

Another camp was located on Quartz Creek at old PFI Camp 12. The area covered from this camp was in the Hollywood vicinity and the Three-Mile Creek drainage. Part of this area supported a light ribes concentration, and the ribes population was reduced to a maintenance standard wherever practicable.

A small crew was worked from the blister rust control headquarters. This crew did mostly spot working, cleaning up small isolated patches of ribes in both upland and stream types. The ribes population was quite low in most cases, averaging less than 50 per acre.

Camps operated by the Forest Service included three 33-man camps and two 66-man units. The majority of the work was concentrated in the Moose City area. The three camps in this vicinity were located on Moose, China and Osier Creek drainages. The camps on China and Osier Creeks worked almost entirely on chemical eradication of Ribes petiolare which occurred in heavy concentrations on the main creeks and tributaries. The camp at Moose Creek did some chemical ribes eradication but worked mainly in young pole and reproduction stands on Moose and Independent Creek drainages. Ribes eradication work is quite difficult in this district because of the large amount of R. petiolare in the streams and the heavy concentrations of exceptionally large R. lacustre in the upland stands. The work was not completed in any of the three camp areas.

A Forest Service camp was established at the Bungalow Ranger Station for a short period during the early field season. When the roads were passable, this camp moved to Three Bear and worked areas in the Tamarack Creek drainage consisting entirely of reproduction and pole stands.

A Forest Service crew worked on the Upper Beaver Creek plantation during the early part of the season. This area was burned and planted in 1940 and supported 2,000 ribes per acre. Working conditions were not extremely difficult due to the fact that the ribes were small and the area was worked during the early part of the season before other vegetation had leaved out. The greatest handicap was weather conditions during the time the work was performed. This camp later moved to Lodge Creek, and the work in that drainage was completed. The area was difficult to work due to the density of the

brush and the large number of old R. viscosissimum present. On July 15, this camp moved to the Sourdough Timber Sales area. The timber from this area was cut in 1939 and 1940 with only the mature white pine being removed. The present overwood is too heavy to permit development of white pine reproduction, consequently only part of the area which has been opened up sufficiently is being considered for blister rust control. Control work on the rest of the area will be postponed until such time as the residual stand is removed.

METHODS AND EQUIPMENT

Because of the inexperienced laborers employed during 1942 a standard 3-man crew was used primarily throughout the season. However, there was a variation in formation that was given limited use. In order to maintain the proper efficiency it became evident that some checking immediately behind the workers was necessary. The methods development project had demonstrated that grouping three or four crews on adjacent strips of greater than normal width with a man checking directly behind each 3-man crew and the foreman supervising and checking the entire gang formation increased the efficiency of the work while still covering the same amount of ground per man-day. This method worked out satisfactorily in several of the cutover areas. Some adjustment in the formation had to be made to meet various conditions, but the principle of checking directly behind the crews served to maintain high efficiency standards at no increase in cost. In practically all cases string was laid in advance as has been done in previous years. The stream type chemical work in the camps was carried on by the standard size chemical crews.

STATUS OF CONTROL

Although considerable progress has been made in ribes eradication work on the Clearwater operation since 1929, the blister rust situation still remains serious. Blister rust became established throughout the operation before control could be established. As a result heavy infection on certain areas has taken place, and some damage has resulted in stands within the control boundary.

In 1929 mature white pine comprised approximately 62 per cent of the control area. Since that time considerable logging has taken place creating a major control problem. The mature type required little or no blister rust control work since these stands are expected to be logged before damage takes place, but the protection of white pine reproduction following logging is an expensive job because of the germination of large numbers of ribes. The percentage of mature type in the control area has dropped to 45 per cent, meaning that 91,000 acres of cutover lands have been added to the control job. In approximately 50 per cent of the logged areas a heavy residual stand of secondary species is preventing the reestablishment of white pine, and for this reason they are not considered for control work. Some logged areas are also being placed in a deferred status because there is not an adequate seed source, and white pine regeneration is not taking place. To date most cutover areas of high priority have received at least one working and can be protected with some additional work.

The protection of white pine reproduction on cutover lands is going to be more difficult in the future unless particular care is given to the method of harvesting the present mature stands. Without an adequate seed source the period for regeneration from stored seed is relatively short. Germination of ribes and pine seed occurs at the same time, and because of their close association, infection naturally takes place before the ribes are large enough to be removed. If the stocking is more than adequate, as is the case on portions of sec. 17, T. 37 N., R. 5 E., in the Hollywood vicinity, it is possible to remove the ribes before too many young pine are killed to affect the stocking of the stand. A good seed source should always be left at the time of cutting if a future crop of pine is desired from natural seeding.

White pine reproduction stands 15 years old or older on the Clearwater operation are as a whole in fair condition. With few exceptions these stands can be permanently protected without much difficulty if an adequate control program is continued. On the Shoe Burn, Big Horn and Hemlock Creek areas no future control work is planned because of the high cost of working and the amount of disease already present.

The majority of white pine pole stands are in satisfactory condition with the exception of 2,500 acres of advanced pole in the Moose City district which has not been initially worked. Stands in French, Tamarack, Musselshell and Snake Creeks will need very little future work.

The Clearwater operation was originally a heavy R. petiolare belt. Nearly all the stream type at one time supported a heavy population of this ribes species. Chemical work has been carried on since 1929, and at the present time there remains only the Moose City district which has not been covered by chemical ribes eradication. This should be completed next year. On the Clearwater Timber Protective Association lands all streams within the control boundary have been thoroughly covered. Although a satisfactory job was done, two major streams, Washington and Schofield Creeks, and their tributaries must be mopped up during the 1943 field season. Ribes petiolare seedlings have become established along the banks and should be removed mainly by hand-pulling methods, although a small amount of chemical work will be needed.

PREERADICATION SURVEY

Areas were inspected throughout the season by the permanent personnel. This type of random inspection gives general information on the progress of the disease, regeneration and growth of ribes and pine, and other information necessary in evaluating white pine stands and planning control work. Where more detailed and specific information is required for planning the current and following seasons' work, a systematic survey is conducted by specially trained men.

CHECKING AND PINE DISEASE SURVEY

The activities of the checking organization were curtailed this season due to the difficulty of securing and holding experienced and qualified personnel. It was necessary to use the available, experienced and qualified men to fill the depleted ranks of eradication supervisors. However, a sufficient number of new men were trained to take care of the most essential checking work.

Complete four per cent checks were postponed on some areas where advance surveys and sample checks following eradication showed a very low ribes population. A check will be run in from three to five years in conjunction with the disease survey when some measure of the infection resulting from missed bushes can be obtained.

Advance surveys and post checks were run on areas worked during the past season where recent information on distribution and quantity of ribes was not available. After the close of the regular season advance survey was run on the remaining pole and reproduction stands in the Moose City basin area that had not been previously surveyed.

Regular check following eradication work was run on 3,017 acres of upland area, and 8,069 acres were covered on advance survey and post check.

Pine disease survey was limited to random inspection and sampling by permanent personnel and temporary overhead. Due to the extensive coverage of areas during the past several seasons, requirements for pine disease survey this year were small.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1942 CLEARWATER OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 7,086.85
	Regular BLR-3-4	12,727.51
	Subtotal	19,814.36
State of Idaho Clearwater Timber Protective Association	State BLR-3-4	9,865.87
	Private BLR-3-4	6,000.00
	Subtotal	15,865.87
Forest Service	Regular BLR-4	80,728.80
Total		\$116,409.03

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1942
CLEARWATER OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$5,739.62			\$ 5,739.62	\$ 1,982.50	\$ 7,722.12
Sal. temp. men		\$ 1,812.87	\$ 1,630.33	3,443.20	12,341.79	15,784.99
Wages, temp. labs.	493.36	5,913.72	14,235.54	20,642.62	46,166.92	66,809.54
Subs. supplies		4,510.88		4,510.88	15,261.97	19,772.85
Equipment	9.51	1.57		11.08	3,615.49	3,626.57
Travel & transp.	250.26	357.71		607.97	1,155.35	1,763.32
Other supplies	594.10	130.76		724.86	204.78	929.64
Total	\$7,086.85	\$12,727.51	\$15,865.87	\$35,680.23	\$80,728.80	\$116,409.03

TABLE 2A

DISTRIBUTION OF EXPENDITURES BY PROJECTS, 1942
CLEARWATER OPERATION

Project	Expenditures	Number Effective Man-Days	Effective Man-Day Cost
Planning, Coordination and Technical Direction BEPQ Regular BLR-1-4	\$ 7,086.85		
Cooperative - State and Private Lands BEPQ Regular BLR-3-4	12,727.51	3,531	\$ 8.10
State of Idaho BLR-3-4	9,865.87		
CTPA BLR-3-4	6,000.00		
Total	28,593.38		
National Forest Lands Forest Service Regular BLR-4	\$80,728.80	6,612	\$12.21

	Bureau	Forest Service
Number meals served	20,793	43,920
Average cost per meal	\$0.217	\$0.347
Pounds of twine	847	1,710
Pounds of chemical		28,171



SUMMARY OF RIBES ERADICATION, 1942
CLEARWATER OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray	Ribes Remaining Per Acre	
								Bushes	Live Stem
Burn (1940-1942)		60		60	232	134,749			
Cutover (Prior 1940)		708	2,933	3,641	3,903	863,268		8.9	13.0
Reproduction	1,328	218		1,546	2,704	244,542		25.0	77.5
Pole		1,142		1,142	1,095	75,818			
All Upland	1,328	2,128	2,933	6,389	7,934	1,318,377		11.1	21.7
Stream (Hand)	378	106	207	691	1,410	310,665			
Stream (Chemical)	378	106		484	799	65,715	21,905		
All Stream	378	106	207	691	2,209	376,380			
All Types	1,706	2,234	3,140	7,080	10,143	1,694,757		11.1	21.7

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
					Man- Days	Ribes	Gallons Spray	Bushes	Live Stem
Reproduction	1,328	2,061	194,892		1.55	147		29.2	104.2
Stream (Hand)	378	1,151	294,131		3.04	778			
Stream (Chemical)	378	691	63,837	21,279	1.83	169	56		
All Stream	378	1,842	357,968		4.87	947			
All Types	1,706	3,903	552,860		2.29	324		29.2	104.2

TABLE 3B - SECOND WORKING

Burn (1940-1942)	60	232	134,749		3.87	2,246			
Cutover (Prior 1940)	708	821	737,913		1.16	1,042		13.3	28.3
Reproduction	218	643	49,650		2.95	228		18.6	36.7
Pole	1,142	1,095	75,818		.96	66			
All Upland	2,128	2,791	998,130		1.31	469		17.4	34.8
Stream (Hand)	106	112	5,600		1.06	53			
Stream (Chemical)	106	108	1,878	626	1.02	18	6		
All Stream	106	220	7,478		2.08	71			
All Types	2,234	3,011	1,005,608		1.35	450		17.4	34.8

TABLE 3C - THIRD WORKING

Cutover (Prior 1940)	2,933	3,082	125,355		1.05	43		8.8	12.7
Stream (Hand)	207	147	10,934		.71	53			
All Types	3,140	3,229	136,289		1.03	43		8.8	12.7



TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1942
CLEARWATER OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
						Man- Days	Ribes	Gallons Per Sprayed Area	Bushes	Live Stem
First	FS-Reg.	1,706	3,903	552,860	21,279	2.29	324	56	29.2	104.2
Second	EQ-Coop.	436	302	50,202		.69	115		13.3	28.3
	FS-Reg.	1,798	2,709	955,406	626	1.51	531		18.6	36.7
	Total	2,234	3,011	1,005,608	626	1.35	450		17.4	34.8
Third	EQ-Coop.	3,140	3,229	136,289		1.03	43		8.8	12.7
All Workings	EQ-Coop.	3,576	3,531	186,491		.99	52		8.9	13.0
	FS-Reg.	3,504	6,612	1,508,266	21,905	1.89	430	45	25.0	77.5
	Total	7,080	10,143	1,694,757	21,905	1.43	239	45	11.1	21.7

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1942
CLEARWATER OPERATION

State	Working	Number of Acres Worked											
		By Forest Service			By Bureau of Entomology and Plant Quarantine				Total				
		National Forest	Private	Total	National Forest	State	Private	Total	Federal		Other		
									National Forest	State	Private	Total	Total
Idaho	First	1,616	90	1,706					1,616		90	90	1,706
	Second	1,638	160	1,798			436	436	1,638		596	596	2,234
	Third				120	294	2,726	3,140	120	294	2,726	3,020	3,140
	Total	3,254	250	3,504	120	294	3,162	3,576	3,374	294	3,412	3,706	7,080

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1942
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes by Species				Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes irriguum	
First	Reproduction	1,328	150,313	44,565	14		194,892
	Stream	378	294,131		63,837		357,968
	All Types	1,706	444,444	44,565	63,851		552,860
Second	Burn (1940-1942)	60	32,168	102,581			134,749
	Cutover (Prior 1940)	708	42,851	690,535	148	4,379	737,913
	Reproduction	218	26,954	22,696			49,650
	Pole	1,142	48,337	27,415	66		75,818
	All Upland	2,128	150,310	843,227	214	4,379	998,130
	Stream	106	5,600		1,878		7,478
	All Types	2,234	155,910	843,227	2,092	4,379	1,005,608
Third	Cutover (Prior 1940)	2,933	40,302	79,746	5,307		125,355
	Stream	207	6,392	17	4,525		10,934
	All Types	3,140	46,694	79,763	9,832		136,289
All Workings	Burn (1940-1942)	60	32,168	102,581			134,749
	Cutover (Prior 1940)	3,641	83,153	770,281	5,455	4,379	863,268
	Reproduction	1,546	177,267	67,261	14		244,542
	Pole	1,142	48,337	27,415	66		75,818
	All Upland	6,389	340,925	967,538	5,535	4,379	1,318,377
	Stream	691	306,123	17	70,240		376,380
	All Types	7,080	647,048	967,555	75,775	4,379	1,694,757

SUMMARY OF RIBES ERADICATION, 1929-1942
CLEARWATER OPERATION

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Burn (1940-1942)		60		60	232	134,749	
Cutover (Prior 1940)	27,726	33,053	8,935	69,714	70,188	22,049,184	
Burn (Prior 1940)	1,045	432		1,477	1,777	1,285,330	
Reproduction	70,879	21,171	2,324	94,374	139,737	36,761,160	
Pole	29,211	13,995		43,206	24,030	4,896,421	
Mature	219,289	16,067		235,356	107,681	24,234,186	
Brush	2,795	79		2,874	2,578	732,633	
Subalpine	122			122	118	53,948	
Meadow-Field	1,890			1,890			
All Upland	352,957	84,857	11,259	449,073	346,341	90,147,611	
Stream (Hand)	41,984	22,041	2,381	66,406	64,314	14,330,099	
Stream (Chemical)	14,808	5,815	498	21,121	39,196	2,736,420	911,940
Stream (Mechanical)	65	13		78	1,258	188,983	
Stream (Zone)		1,666		1,666	1,129	280,094	
All Stream	42,049	23,720	2,381	68,150	105,897	17,535,596	
All Types	395,006	108,577	13,640	517,223	452,238	107,683,207	

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man- Days	Ribes	Gallons Spray
Cutover (Prior 1940)	27,726	25,888	10,610,089		.93	383	
Burn (Prior 1940)	1,045	1,246	917,609		1.19	878	
Reproduction	70,879	106,529	33,322,668		1.50	470	
Pole	29,211	16,138	3,785,629		.55	130	
Mature	219,289	99,880	23,422,354		.46	107	
Brush	2,795	2,536	729,247		.91	261	
Subalpine	122	118	53,948		.97	442	
Meadow-Field	1,890						
All Upland	352,957	252,335	72,841,544		.71	206	
Stream (Hand)	41,984	44,932	11,399,947		1.07	272	
Stream (Chemical)	14,808	30,746	2,364,692	787,964	2.08	160	53
Stream (Mechanical)	65	1,233	188,983		18.97	2,907	
All Stream	42,049	76,971	13,953,622		1.83	332	
All Types	395,006	329,306	86,795,166		.83	220	

TABLE 7B - SECOND WORKING

Burn (1940-1942)	60	232	134,749		3.87	2,246	
Cutover (Prior 1940)	33,053	34,368	10,510,047		1.04	318	
Burn (Prior 1940)	432	531	367,721		1.23	851	
Reproduction	21,171	30,210	3,191,469		1.43	151	
Pole	13,995	7,892	1,110,792		.56	79	
Mature	16,067	7,801	811,832		.49	51	
Brush	79	42	3,386		.53	43	
All Upland	84,857	81,076	16,129,996		.96	190	
Stream (Hand)	22,041	17,571	2,683,855		.80	122	
Stream (Chemical)	5,815	8,096	357,055	119,085	1.39	61	20
Stream (Mechanical)	13	25			1.92		
Stream (Zone)	1,666	1,129	280,094		.68	168	
All Stream	23,720	26,821	3,321,004		1.13	140	
All Types	108,577	107,897	19,451,000		.99	179	

TABLE 7C - THIRD WORKING

Cutover (Prior 1940)	8,935	9,932	929,048		1.11	104	
Reproduction	2,324	2,998	247,023		1.29	106	
All Upland	11,259	12,930	1,176,071		1.15	104	
Stream (Hand)	2,381	1,751	246,297		.74	103	
Stream (Chemical)	498	354	14,673	4,891	.71	29	10
All Stream	2,381	2,105	260,970		.83	110	
All Types	13,640	15,035	1,437,041		1.10	105	

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1942
CLEARWATER OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man- Days	Ribes	Gallons Per Sprayed Area
First	EQ-Reg.	4,412	5,273	1,129,228	79,864	1.20	256	41
	EQ-Coop.	24,005	16,862	3,769,434	118,973	.70	157	34
	EQ-Emerg.	81,649	73,206	20,560,823	88,983	.90	252	75
	FS-Reg.	76,045	58,498	20,249,412	123,660	.77	266	38
	FS-Emerg.	43,963	36,790	14,033,179	11,694	.84	319	79
	CCC	164,932	138,677	27,053,090	364,790	.84	164	73
	Total	395,006	329,306	86,795,166	787,964	.83	220	52
Second	EQ-Coop.	4,863	3,097	379,652	8,404	.64	78	5
	EQ-Emerg.	46,995	46,667	9,160,811	45,754	.97	195	29
	FS-Reg.	24,933	26,169	4,274,520	11,580	1.05	171	5
	FS-Emerg.	10,747	7,526	689,942	10,051	.70	64	22
	CCC	21,039	25,438	4,946,075	43,296	1.21	235	27
	Total	108,577	107,897	19,451,000	119,085	.99	179	15
Third	EQ-Coop.	4,313	4,521	244,065		1.05	57	
	EQ-Emerg.	5,326	6,404	676,459	2,110	1.20	127	19
	FS-Reg.	1,292	1,291	102,138		1.00	79	
	FS-Emerg.	1,198	1,066	171,901	2,270	.89	143	13
	CCC	1,511	1,753	242,478	511	1.16	160	2
	Total	13,640	15,035	1,437,041	4,891	1.10	105	9
All Workings	EQ-Reg.	4,412	5,273	1,129,228	79,864	1.20	256	41
	EQ-Coop.	33,181	24,480	4,393,151	127,377	.74	132	25
	EQ-Emerg.	133,970	125,277	30,398,093	136,847	.94	227	47
	FS-Reg.	102,270	85,958	24,626,070	135,240	.84	241	25
	FS-Emerg.	55,908	45,382	14,895,022	24,015	.81	266	31
	CCC	187,482	165,868	32,241,643	408,597	.88	172	60
	Total	517,223	452,238	107,683,207	911,940	.87	208	40

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1942
CLEARWATER OPERATION

Working	Number of Acres Worked						
	Federal			Other			Total
	National Forest	Public Domain	Total	State	Private	Total	
First	149,802	3,680	153,482	78,834	162,690	241,524	395,006
Second	49,083	628	49,711	14,808	44,059	58,866	108,577
Third	3,780	12	3,792	1,177	8,671	9,848	13,640
Total	202,665	4,320	206,985	94,819	215,419	310,238	517,223

TABLE 10

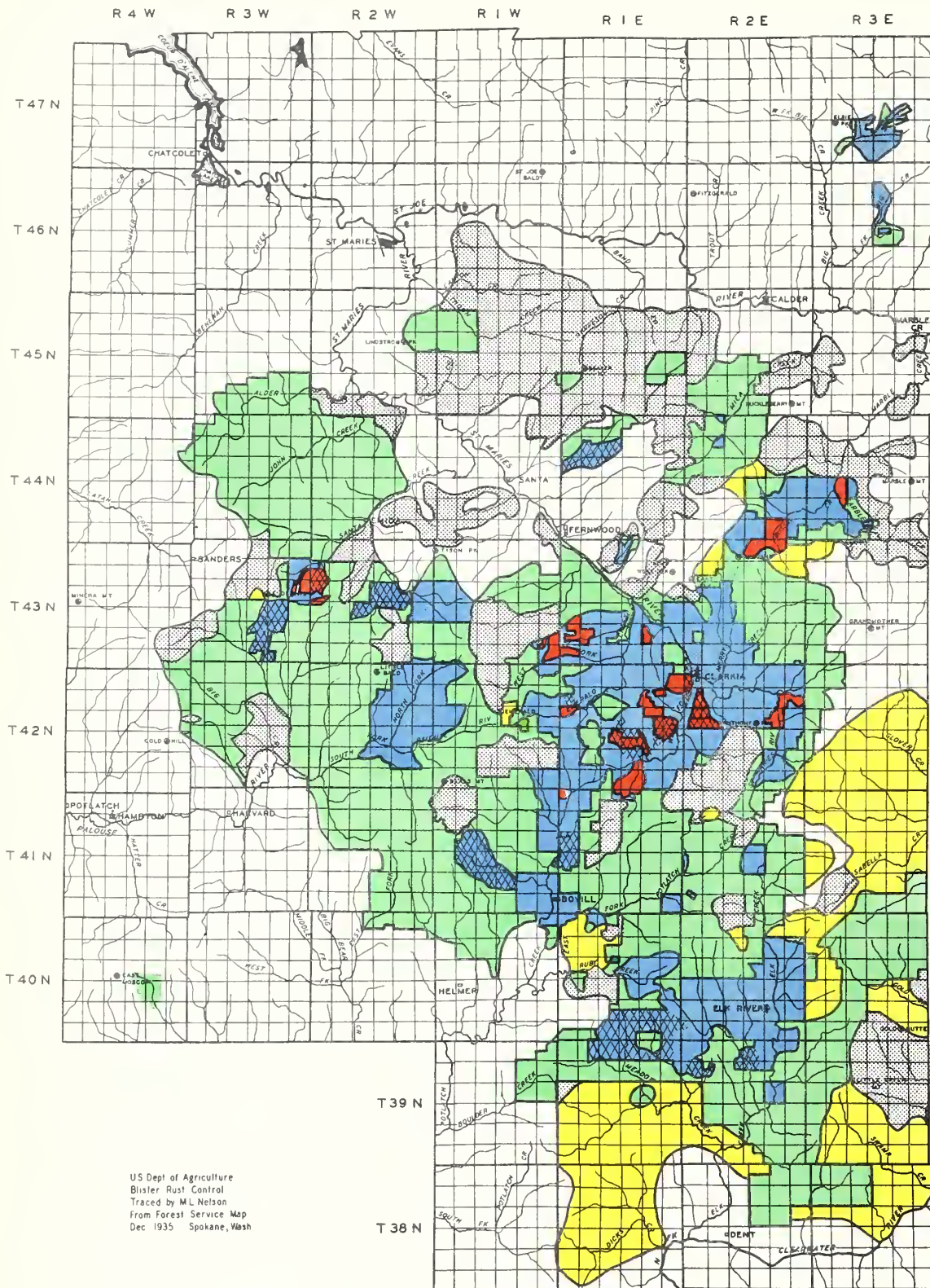
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1929-1942
CLEARWATER OPERATION

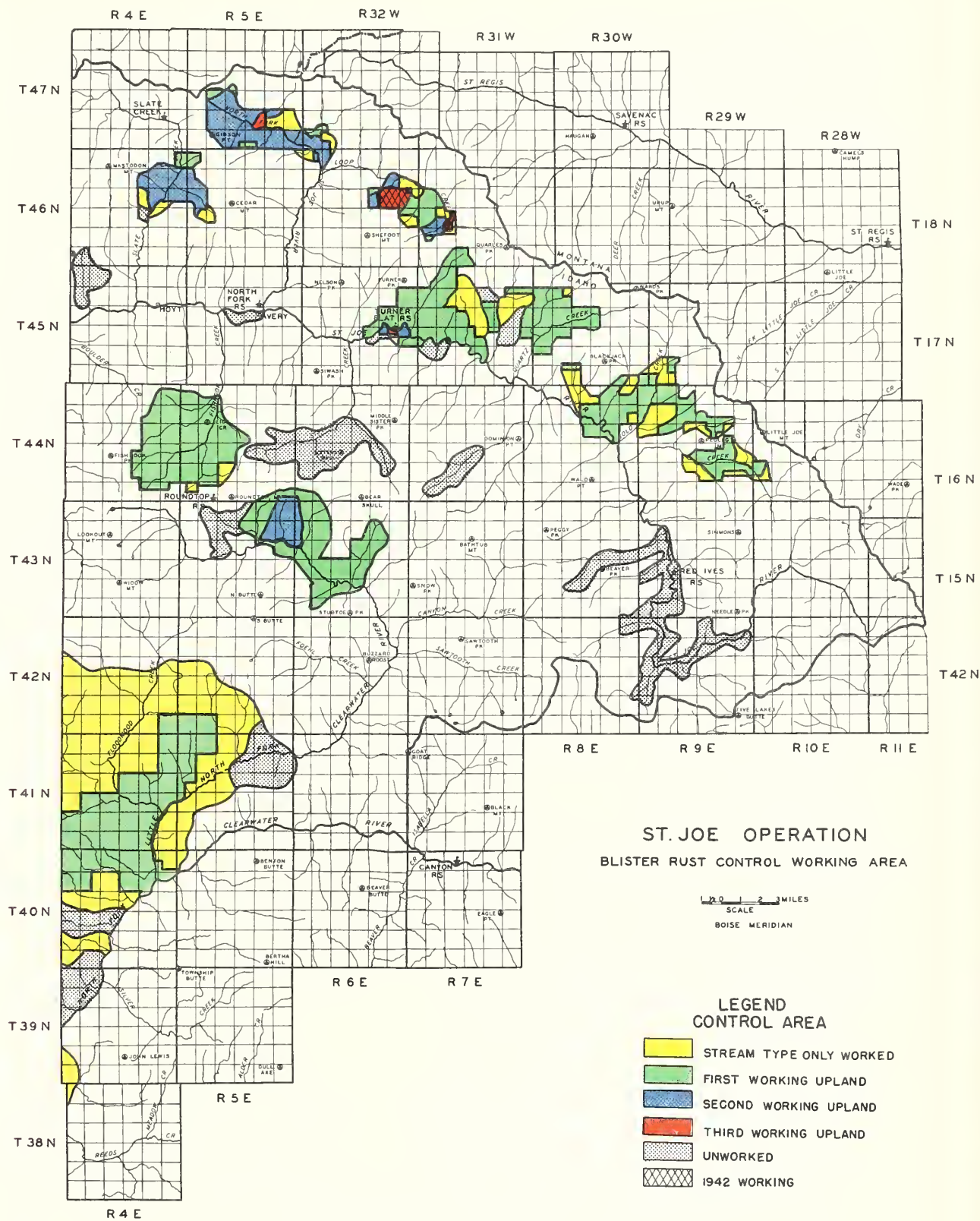
Ownership Class	Number of Acres			Acres on Which Working Is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
National Forest	149,802	46,068	195,870	8,860	204,730
Public Domain	3,680	350	4,030		4,030
Subtotal Federal	153,482	46,418	199,900	8,860	208,760
State	78,834	2,956	81,790	11,200	92,990
Private	162,690	17,620	180,310	27,940	208,250
Subtotal Other	241,524	20,576	262,100	39,140	301,240
Total	395,006	66,994	462,000	48,000	510,000

TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1929-1942
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes by Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inermis	Ribes irriguum	Ribes triste	
First	Cutover (Prior 1940)	27,726	2,100,601	8,431,923	38,603	27,752	11,210		10,610,089
	Burn (Prior 1940)	1,045	74,796	838,377	568		3,868		917,609
	Reproduction	70,879	7,893,438	25,174,796	75,977	47,326	131,131		33,322,668
	Pole	29,211	2,467,634	1,278,820	31,617	6	7,090	462	3,785,629
	Mature	219,289	16,261,450	6,795,503	197,832	107,922	59,621	26	23,422,354
	Brush	2,795	210,516	490,931	17,270	114	10,416		729,247
	Subalpine	122	53,500	448					53,948
	Meadow-Field	1,890							
	All Upland	352,957	29,061,935	43,010,798	361,867	183,120	223,336	488	72,841,544
	Stream	42,049	10,155,156	324,255	2,746,983	701,834	25,394		13,953,622
Second	All Types	395,006	39,217,091	43,335,053	3,108,850	884,954	248,730	488	86,795,166
	Burn (1940-1942)	60	32,168	102,581					134,749
	Cutover (Prior 1940)	33,053	1,174,310	9,245,331	77,606	724	12,076		10,510,047
	Burn (Prior 1940)	432	19,437	342,837	5,447				367,721
	Reproduction	21,171	720,132	2,459,286	12,011	4	36		3,191,469
	Pole	13,995	545,661	548,785	16,095	1	250		1,110,792
	Mature	16,067	395,208	400,473	15,768	116		267	811,832
	Brush	79	424	2,962					3,386
	All Upland	84,857	2,887,340	13,102,255	126,927	845	12,362	267	16,129,996
	Stream	23,720	1,888,177	516,470	823,824	76,716	9,141	6,676	3,321,004
Third	All Types	108,577	4,775,517	13,618,725	950,751	77,561	21,503	6,943	19,451,000
	Cutover (Prior 1940)	8,935	164,064	745,015	19,826		143		929,048
	Reproduction	2,324	126,520	118,555	1,934		14		247,023
	All Upland	11,259	290,584	863,570	21,760		157		1,176,071
	Stream	2,381	184,606	2,055	51,493	22,816			260,970
	All Types	13,640	475,190	865,625	73,253	22,816	157		1,437,041
	Burn (1940-1942)	60	32,168	102,581					134,749
	Cutover (Prior 1940)	69,714	3,438,975	18,422,269	136,035	28,476	23,429		22,049,184
	Burn (Prior 1940)	1,477	94,233	1,181,214	6,015		3,868		1,285,330
	Reproduction	94,374	8,740,090	27,752,637	89,922	47,330	131,181		36,761,160
All Workings	Pole	43,206	3,013,295	1,827,605	47,712	7	7,340	462	4,896,421
	Mature	235,356	16,656,658	7,195,976	213,600	108,038	59,621	293	24,234,186
	Brush	2,874	210,940	493,893	17,270	114	10,416		732,633
	Subalpine	122	53,500	448					53,948
	Meadow-Field	1,890							
	All Upland	449,073	32,239,859	56,976,623	510,554	183,965	235,855	755	90,147,611
	Stream	68,150	12,227,939	842,780	3,622,300	801,366	34,535	6,676	17,535,596
	All Types	517,223	44,467,798	57,819,403	4,132,854	985,331	1270,390	7,431	107,683,207





BLISTER RUST CONTROL WORK, ST. JOE OPERATION, 1942

By

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John C. Gynn, Assistant Pathologist

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INTRODUCTION

The ribes eradication program on the St. Joe operation for 1942 was the same size as that of 1941, except for the loss of three CCC camps. The Forest Service financed eight 33-man and five 66-man regular camps. The Bureau of Entomology and Plant Quarantine, State of Idaho, and Potlatch Timber Protective Association cooperated in financing one 33-man and one 66-man camp. The Forest Service camps operated for an average period from May 11 to September 13. The cooperative camps operated for an average period from May 21 to September 15. A shortage of workers necessitated the closing of all camps while working conditions were still favorable.

ORGANIZATION AND ADMINISTRATION

The Forest Service camps were administered by two Forest Service blister rust staff officers through the channels of the Supervisor's office. Technical supervision for all the regular Forest Service camps was administered by the Bureau of Entomology and Plant Quarantine. The cooperative camps were operated and supervised by the Bureau. A checking supervisor from the Bureau was in charge of all checking, and also assisted in the technical supervision of all the camps.

The blister rust control field organization was as follows:

<u>Bureau of Entomology and Plant Quarantine</u>	<u>U. S. Forest Service</u>
H. J. Hartman, Technical Supervisor	D. J. Moore, Forest Officer
W. F. Painter, Assistant Operation Supervisor in charge of checking	M. D. Oaks, Forest Officer
John C. Gynn, Assistant Pathologist	Byron Amsbaugh, Unit Supervisor
	Charles Schwartz, Unit Supervisor

<u>Program</u>	<u>Number Camps</u>	<u>Number Workers</u>	<u>Number Checkers</u>
EQ-Cooperative	2	100	1
FS-Regular	13	550	8
Total number employed on blister rust control		650	9

The field headquarters maintained by the Bureau at Clarkia, Idaho, served as an operating base for both agencies. The transportation of all equipment and supplies to the camps was handled individually by each agency. A warehouseman employed by the Forest Service ordered and distributed all the supplies for both classes of camps.

Former blister rust workers whose services were satisfactory during the 1941 season were contacted prior to the field season as to their availability and their desire to accept employment on blister rust. Approximately 30 per cent of the men who were contacted reported for work when called. The remaining 70 per cent of the workers were inexperienced men who were recruited through the local high schools and from various colleges and universities throughout the country. Almost continuous rains in May and June interrupted the field work. As a result many of the experienced men as well as the more capable inexperienced men left to seek better paying jobs. The replacements were usually younger men, many being 15, 16, and 17 years old. When favorable weather conditions made field work possible most of the camps were filled with inexperienced and very young workers. In several cases it was necessary to employ inexperienced men as camp foremen. The labor turnover was such that a constant training program was necessary throughout the summer in all of the camps.

LOCATION AND DESCRIPTION OF AREAS

Ribes eradication in 1942 was confined to well established pole and reproduction stands. Except for 50 acres of plantation which were given first working, all effort was confined to second and third working. Areas worked were included in the St. Maries, Palouse, and Elk River drainages.

The heavy demand for lumber for war needs greatly accelerated logging on this operation during the 1942 season. White fir, Douglas fir, cedar and hemlock, usually not cut during white pine logging operations, are now being harvested along with the white pine. However, in practically all of the logged areas the number of inferior trees remaining precludes the establishment of satisfactory white pine reproduction. There is no immediate need for control work on any of the recently logged areas.

METHODS AND EQUIPMENT

The standard eradication practices as outlined in the manual with modifications to meet existing field conditions were employed throughout the operation. The number of inexperienced men made the laying of string line in advance of the eradication crews a universal practice. This method tended to improve the quality as well as the quantity of the work. The use of three 2-man crews with a straw boss working and checking behind the crews proved very satisfactory especially with inexperienced labor.

PREERADICATION SURVEY

A five-man survey crew financed by regular Forest Service funds inspected a number of white pine areas subsequent to the eradication season. Parallel strips were run every 10 chains and 4-milacre plots were taken at the end of each chain to determine the presence of white pine in relation to other species. Approximately 18,560 acres were inspected at an average cost of \$0.05 per acre. The information will be valuable in planning future eradication programs and will aid in eliminating marginal pine areas.

CHECKING

There were three checkers available for the 1942 field season who worked during 1941. Nine experienced eradication men were trained for checking work. Additional checkers would have been trained but qualified workers were not available. Constant training and supervision were necessary throughout the season in order to insure a high quality check on worked areas. Seventy per cent of the checkers' time was devoted to regular check, 20 per cent to post check and 10 per cent assisting in ribes eradication work.

A total of 22,176 acres of first, second and third working was checked for an average cost of \$0.127 per acre.

For the most part all areas currently post checked were worked during the 1942 field season. Regular checking activities prevented any extensive post checking, and the loss of all checking personnel by mid-September precluded any disease survey on the operation.

CONTROL STATUS

The over-all blister rust control picture on the St. Joe operation may be summarized as follows:

Through the 1942 field season 535,917 acres have been given first working, 138,609 acres have been worked twice, and 18,156 acres three times. Approximately 60 per cent of the total area within the control unit has been worked once, 16 per cent twice, and 2 per cent for the third time. Of the remaining 40 per cent of unworked area at least 30 per cent may be deferred indefinitely in that it represents mature timber which is being logged or will be logged in the near future. There are 255,236 acres requiring rework. This is 42 per cent of the total area represented by first working. There are 101,804 acres classified for post check. Past inspections of post check areas indicate that 60 per cent of the areas inspected would require additional work and 40 per cent would be classified as maintenance. There are 208,877 acres of maintenance which is 39 per cent of the total area worked.

The over-all infection condition on the operation is very encouraging. There have been noticeable increases in certain areas which were originally heavy infection centers. Generally the increases for other areas have been very minor. If the present size program can be maintained with a possible increase in the number of camps, very effective control will be accomplished during the coming years.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1942
ST. JOE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 12,331.39
	Regular BLR-3-4	16,689.55
	Subtotal	29,020.94
State of Idaho Potlatch Timber Protective Association	State BLR-3-4	3,809.95
	Private BLR-3-4	5,200.34
	Subtotal	9,010.29
Forest Service	Regular BLR-4	179,835.55
Total		\$217,866.78

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1942
ST. JOE OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$ 8,560.95			\$ 8,560.95	\$ 6,268.33	\$ 14,829.28
Sal. temp. men	191.07	\$ 1,808.86	\$ 420.71	2,420.64		2,420.64
Wages, temp. labs.	1,352.53	12,066.45	8,589.58	22,008.56	129,388.03	151,396.59
Subs. supplies	299.76	2,290.74		2,590.50	33,442.98	36,033.48
Equipment	16.00	1.61		17.61	6,906.77	6,924.38
Travel & transp.	389.96	344.66		734.62	1,351.25	2,085.87
Chemicals					362.60	362.60
Twine					871.40	871.40
Other supplies	1,521.12	177.23		1,698.35	1,244.19	2,942.54
Total	\$12,331.39	\$16,689.55	\$9,010.29	\$38,031.23	\$179,835.55	\$217,866.78

TABLE 2A

DISTRIBUTION OF EXPENDITURES BY PROJECTS, 1942
ST. JOE OPERATION

Project	Expenditures	Number Effective Man-Days	Effective Man-Day Cost
Planning, Coordination and Technical Direction			
BEPQ Regular BLR-1-4	\$ 12,331.39		
Cooperative - State and Private Lands			
BEPQ Regular BLR-3-4	16,689.55	3,537	\$ 7.27
State of Idaho BLR-3-4	3,809.95		
PTPA BLR-3-4	5,200.34		
Total	25,699.84		
National Forest Lands			
Forest Service Regular BLR-4	\$179,835.55	17,431	\$10.32

	<u>Bureau</u>	<u>Forest Service</u>
Number meals served	21,250	93,875
Average cost per meal	\$0.228	\$0.289
Pounds of twine	862	2,530
Pounds of chemical		3,300

SUMMARY OF RIBES ERADICATION, 1942
ST. JOE OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray	Ribes Remaining Per Acre	
								Bushes	Live Stem
Cutover (1940-1942)		211	54	265	189	14,002		7	6
Cutover (Prior 1940)		2,338		2,338	2,641	172,662		6	22
Burn (Prior 1940)		20		20	42	377		6	37
Reproduction	50	6,729	3,364	10,143	11,738	284,472		4	12
Pole		7,765	1,087	8,852	5,921	293,787		2	9
Mature		410		410	159	9,106			
All Upland	50	17,473	4,505	22,028	20,690	774,406		3	11
Stream (Hand)		9	139	148	193	12,966			
Stream (Chemical)		8	133	141	85	4,320	1,440		
All Stream		9	139	148	278	17,286			
All Types	50	17,482	4,644	22,176	20,968	791,692		3	11

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
					Man- Days	Ribes	Gallons Spray	Bushes	Live Stem
Reproduction	50	152	5,860		3.04	117			

TABLE 3B - SECOND WORKING

Cutover (1940-1942)	211	147	6,191		.70	29		9	7
Cutover (Prior 1940)	2,338	2,641	172,662		1.13	74		6	22
Burn (Prior 1940)	20	42	377		2.10	19		6	37
Reproduction	6,729	6,251	168,518		.93	25		4	14
Pole	7,765	5,205	284,043		.67	37		3	10
Mature	410	159	9,106		.39	22			
All Upland	17,473	14,445	640,897		.83	37		4	13
Stream (Hand)	9	75	6,899		8.33	765			
Stream (Chemical)	8	27	1,440	480	3.38	180	60		
All Stream	9	102	8,329		11.33	925			
All Types	17,482	14,547	649,226		.83	37		4	13

TABLE 3C - THIRD WORKING

Cutover (1940-1942)	54	42	7,811		.78	145		1	1
Reproduction	3,364	5,335	110,094		1.59	33		3	8
Pole	1,087	716	9,744		.66	9		2	5
All Upland	4,505	6,093	127,649		1.35	28		2	7
Stream (Hand)	139	118	6,077		.85	44			
Stream (Chemical)	133	58	2,880	960	.44	22	7		
All Stream	139	176	8,957		1.27	64			
All Types	4,644	6,269	136,606		1.35	29		2	7

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1942
ST. JOE OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
						Man- Days	Ribes	Gallons Per Sprayed Area	Bushes	Live Stem
First	FS-Reg.	50	152	5,860		3.04	117			
Second	EQ-Coop.	6,189	3,537	192,806		.57	31		3	14
	FS-Reg.	11,293	11,010	456,420	480	.97	40	60	4	12
	Total	17,482	14,547	649,226	480	.83	37	60	4	13
Third	FS-Reg.	4,644	6,269	136,606	960	1.35	29	7	2	7
All Workings	EQ-Coop.	6,189	3,537	192,806		.57	31		3	14
	FS-Reg.	15,987	17,431	598,886	1,440	1.09	37	10	4	11
	Total	22,176	20,968	791,692	1,440	.95	36	10	3	11

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1942
ST. JOE OPERATION

State	Working	Number of Acres Worked																
		By Forest Service					By Bureau of Entomology and Plant Quarantine					Total						
												Federal			Other			
		Natl. For.	Pub. Dom.	State	Pri- vate	Total	Natl. For.	Pub. Dom.	State	Pri- vate	Total	Natl. For.	Pub. Dom.	Total	State	Pri- vate	Total	Total
Idaho	First	50			50						50		50				50	
	Second	7,227	185	1,383	2,498	11,293	2,155	60	1,260	2,714	6,199	9,392	245	9,627	2,643	5,212	7,855	17,432
	Third	2,673	60	232	1,679	4,644						2,673	60	2,733	232	1,679	1,911	4,644
	Total	9,950	245	1,615	4,177	15,987	2,155	60	1,260	2,714	6,189	12,105	305	12,410	2,875	6,891	9,766	22,176

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1942
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes by Species				Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inermis	
First	Reproduction	50	3,188	2,672			5,860
Second	Cutover (1940-1942)	811	4,089	2,102			6,191
	Cutover (Prior 1940)	2,338	114,138	57,800	712	12	172,662
	Burn (Prior 1940)	20	61	316			377
	Reproduction	6,729	103,476	58,607	465	5,970	168,518
	Pole	7,765	69,488	211,159	2,555	841	284,043
	Mature	410	645	8,461			9,106
	All Upland	17,473	291,897	338,445	3,732	6,823	640,897
	Stream	9	6,811		1,518		8,329
	All Types	17,482	298,708	338,445	5,250	6,823	649,226
Third	Cutover (1940-1942)	54	6,219	1,592			7,811
	Reproduction	3,364	64,485	44,819	567	223	110,094
	Pole	1,087	5,369	4,355		4	9,744
	All Upland	4,505	76,073	50,766	571	239	127,649
	Stream	139	3,608	42	5,307		8,957
	All Types	4,644	79,681	50,808	5,878	239	136,606
All Workings	Cutover (1940-1942)	265	10,308	3,694			14,002
	Cutover (Prior 1940)	2,338	114,138	57,800	712	12	172,662
	Burn (Prior 1940)	20	61	316			377
	Reproduction	10,143	171,149	106,098	1,032	6,193	284,472
	Pole	8,852	74,857	215,514	2,559	857	293,787
	Mature	410	645	8,461			9,106
	All Upland	22,028	371,158	391,883	4,303	7,062	774,406
	Stream	148	10,419	42	6,825		17,286
	All Types	22,176	381,577	391,925	11,128	7,062	791,692

SUMMARY OF RIBES ERADICATION, 1929-1942
ST. JOE OPERATION

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Cutover (1940-1942)		211	54	265	189	14,002	
Cutover (Prior 1940)	1,009	2,682	230	3,921	4,202	503,959	
Burn (Prior 1940)		20		20	42	377	
Reproduction	217,890	77,687	9,146	304,723	347,013	90,701,936	
Pole	86,838	34,143	2,185	123,166	54,220	9,078,718	
Mature	192,059	10,797	170	203,026	87,223	22,823,872	
Brush	2,452	431		2,883	1,924	679,187	
Subalpine	200			200	416	90,809	
All Upland	500,448	125,971	11,785	638,204	495,229	123,892,850	
Stream (Hand)	34,578	12,611	6,371	53,650	97,527	27,341,323	
Stream (Chemical)	7,404	3,245	739	11,398	26,977	2,390,100	796,700
Stream (Mechanical)	791	27		818	10,420	409,100	
All Stream	35,469	12,638	6,371	54,478	134,924	30,140,523	
All Types	535,917	138,609	18,156	692,682	630,153	154,033,383	

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man- Days	Ribes	Gallons Spray
Cutover (Prior 1940)	1,009	654	100,332		.65	99	
Reproduction	217,890	242,526	81,205,877		1.11	373	
Pole	86,838	33,082	7,780,055		.38	90	
Mature	192,059	78,643	21,688,812		.41	113	
Brush	2,452	1,981	676,620		.77	276	
Subalpine	200	416	90,809		2.08	454	
All Upland	500,448	357,202	111,542,505		.71	223	
Stream (Hand)	34,578	65,337	20,953,990		1.98	604	
Stream (Chemical)	7,404	21,683	2,009,118	669,706	2.93	271	90
Stream (Mechanical)	791	10,101	395,600		12.77	500	
All Stream	35,469	97,121	23,358,708		2.74	659	
All Types	535,917	454,323	134,901,213		.85	252	

TABLE 7B - SECOND WORKING

Cutover (1940-1942)	211	147	6,191		.70	29	
Cutover (Prior 1940)	2,682	3,009	342,166		1.12	128	
Burn (Prior 1940)	20	42	377		2.10	19	
Reproduction	77,687	91,330	9,032,979		1.18	116	
Pole	34,143	19,873	1,270,306		.58	37	
Mature	10,797	8,255	1,097,018		.76	102	
Brush	431	43	2,567		.10	6	
All Upland	125,971	122,699	11,751,604		.97	93	
Stream (Hand)	12,611	22,464	4,843,003		1.78	384	
Stream (Chemical)	3,245	4,731	334,989	111,663	1.46	103	34
Stream (Mechanical)	27	319	13,500		11.81	500	
All Stream	12,638	27,514	5,191,492		2.18	411	
All Types	138,609	150,213	16,943,096		1.08	122	

TABLE 7C - THIRD WORKING

Cutover (1940-1942)	54	42	7,811		.78	145	
Cutover (Prior 1940)	230	539	61,461		2.34	267	
Reproduction	9,146	13,157	463,080		1.44	51	
Pole	2,185	1,265	28,357		.58	13	
Mature	170	325	38,042		1.91	224	
All Upland	11,785	15,328	598,751		1.30	51	
Stream (Hand)	6,371	9,726	1,544,330		1.53	242	
Stream (Chemical)	739	563	45,993	15,331	.76	62	21
All Stream	6,371	10,289	1,590,323		1.61	250	
All Types	18,156	25,617	2,189,074		1.41	121	

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1942
ST. JOE OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man- Days	Ribes	Gallons Per Sprayed Area
First	EQ-Coop.	17,073	13,484	3,864,001	56,611	.79	226	41
	EQ-Emerg.	189,429	118,249	37,196,488	63,506	.62	196	101
	FS-Reg.	86,539	90,374	26,041,309	262,145	1.04	301	95
	FS-Emerg.	70,981	45,138	15,333,106	101,476	.64	216	129
	CCC	171,895	187,078	52,466,309	185,968	1.09	305	101
	Total	535,917	454,323	134,901,213	669,706	.85	252	90
Second	EQ-Coop.	9,329	6,532	361,985	2,674	.70	39	11
	EQ-Emerg.	42,097	36,727	5,940,959	10,557	.87	141	32
	FS-Reg.	69,435	73,802	6,868,176	40,191	1.06	99	25
	CCC	17,748	33,152	3,771,976	58,241	1.87	213	55
	Total	138,609	150,213	16,943,096	111,663	1.08	122	34
Third	EQ-Emerg.	2,993	2,922	455,940	3,025	.98	152	12
	FS-Reg.	12,564	17,580	1,081,116	7,809	1.40	86	20
	CCC	2,599	5,115	652,018	4,497	1.97	251	46
	Total	18,156	25,617	2,189,074	15,331	1.41	121	21
All Workings	EQ-Coop.	26,402	20,016	4,225,986	59,285	.76	160	36
	EQ-Emerg.	234,519	157,898	43,593,387	77,088	.67	186	64
	FS-Reg.	168,538	181,756	33,990,601	310,145	1.08	202	65
	FS-Emerg.	70,981	45,138	15,333,106	101,476	.64	216	129
	CCC	192,242	225,345	56,890,303	248,706	1.17	296	83
	Total	692,682	630,153	154,033,383	796,700	.91	222	70

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1942
ST. JOE OPERATION

Working	Number of Acres Worked						
	Federal			Other			Total
	National Forest	Public Domain	Total	State	Private	Total	
First	216,208	12,578	228,786	67,082	240,049	307,131	535,917
Second	74,715	4,889	79,604	16,694	42,311	59,005	138,609
Third	9,734	190	9,924	1,615	6,617	8,232	18,156
Total	300,657	17,657	318,314	85,391	288,977	374,368	692,682

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1929-1942
ST. JOE OPERATION

Ownership Class	Number of Acres			Acres on Which Working is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
National Forest	216,208	84,783	300,991	11,089	312,080
Public Domain	12,578	10,847	23,425	1,040	24,465
Subtotal Federal	228,786	95,630	324,416	12,129	336,545
State	67,082	26,973	94,055	20,880	114,935
Private	240,049	135,945	375,994	57,451	433,445
Subtotal Other	307,131	162,918	470,049	78,331	548,380
Total	535,917	258,548	794,465	90,460	884,925

TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1929-1942
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes by Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	
First	Cutover (Prior 1940)	1,009	64,897	30,125	5,269	41			100,332
	Reproduction	217,890	15,252,226	65,332,727	121,897	344,709	154,318		81,205,877
	Pole	86,838	3,234,919	4,383,484	21,170	63,499	76,983		7,780,055
	Mature	192,059	10,956,325	10,404,806	28,217	42,519	256,945		21,688,812
	Brush	2,452	93,470	579,731	1,987	1,432			676,620
	Subalpine	200	54,975	35,834					90,809
	All Upland	500,448	29,656,812	80,786,707	178,540	452,200	488,246		111,542,505
	Stream	35,469	16,372,384	888,029	3,331,826	2,749,642	16,695	132	23,358,708
	All Types	535,917	46,029,196	81,654,736	3,510,366	3,201,842	504,941	132	134,901,213
	Cutover (Prior 1940)	211	4,089	2,102					6,191
Second	Cutover (Prior 1940)	2,682	127,379	213,886	729	172			342,166
	Burn (Prior 1940)	20	61	316					377
	Reproduction	77,687	3,410,388	5,517,636	35,104	58,273	11,578		9,032,979
	Pole	34,143	555,353	691,608	4,858	18,483	4		1,270,306
	Mature	10,797	487,781	576,618	778	19	31,822		1,097,018
	Brush	431	456	2,111					2,567
	All Upland	125,971	4,585,507	7,004,277	41,469	76,947	43,404		11,751,604
	Stream	12,638	3,045,855	163,110	1,081,834	753,469	6,073	141,471	5,191,492
	All Types	138,609	7,631,042	7,167,387	1,123,303	830,416	49,477	141,471	16,945,096
	Cutover (1940-1942)	54	6,219	1,592					7,811
Third	Cutover (Prior 1940)	230	15,343	43,297		2,821			61,461
	Reproduction	9,146	197,858	251,779	6,359	7,084			463,080
	Pole	2,185	11,892	16,354	42	69			28,357
	Mature	170	32,990	3,316	8		1,728		38,042
	All Upland	11,785	264,302	316,328	6,409	9,974	1,728		598,751
	Stream	6,371	725,425	23,027	469,363	370,126		2,382	1,590,323
	All Types	18,156	989,727	339,365	4,5772	380,100	1,728	2,382	2,189,074
	Cutover (1940-1942)	265	10,308	3,694					14,002
	Cutover (Prior 1940)	3,921	207,619	287,308	5,998	3,034			503,959
	Burn (Prior 1940)	20	61	316					377
All Workings	Reproduction	304,723	18,860,472	71,102,142	163,360	410,066	165,896		90,701,936
	Pole	123,166	3,802,164	5,091,446	26,070	82,051	76,927		9,078,718
	Mature	203,026	11,477,096	10,984,740	29,003	42,538	290,495		22,823,872
	Brush	2,883	93,926	581,842	1,987	1,432			679,187
	Subalpine	200	54,975	35,834					90,809
	All Upland	638,204	24,506,621	88,087,322	226,418	539,121	533,378		123,892,860
	Stream	54,478	20,143,344	1,074,166	4,883,023	3,873,237	22,768	143,985	30,140,523
	All Types	692,682	54,649,965	89,161,488	5,109,441	4,412,358	556,146	143,985	154,033,383

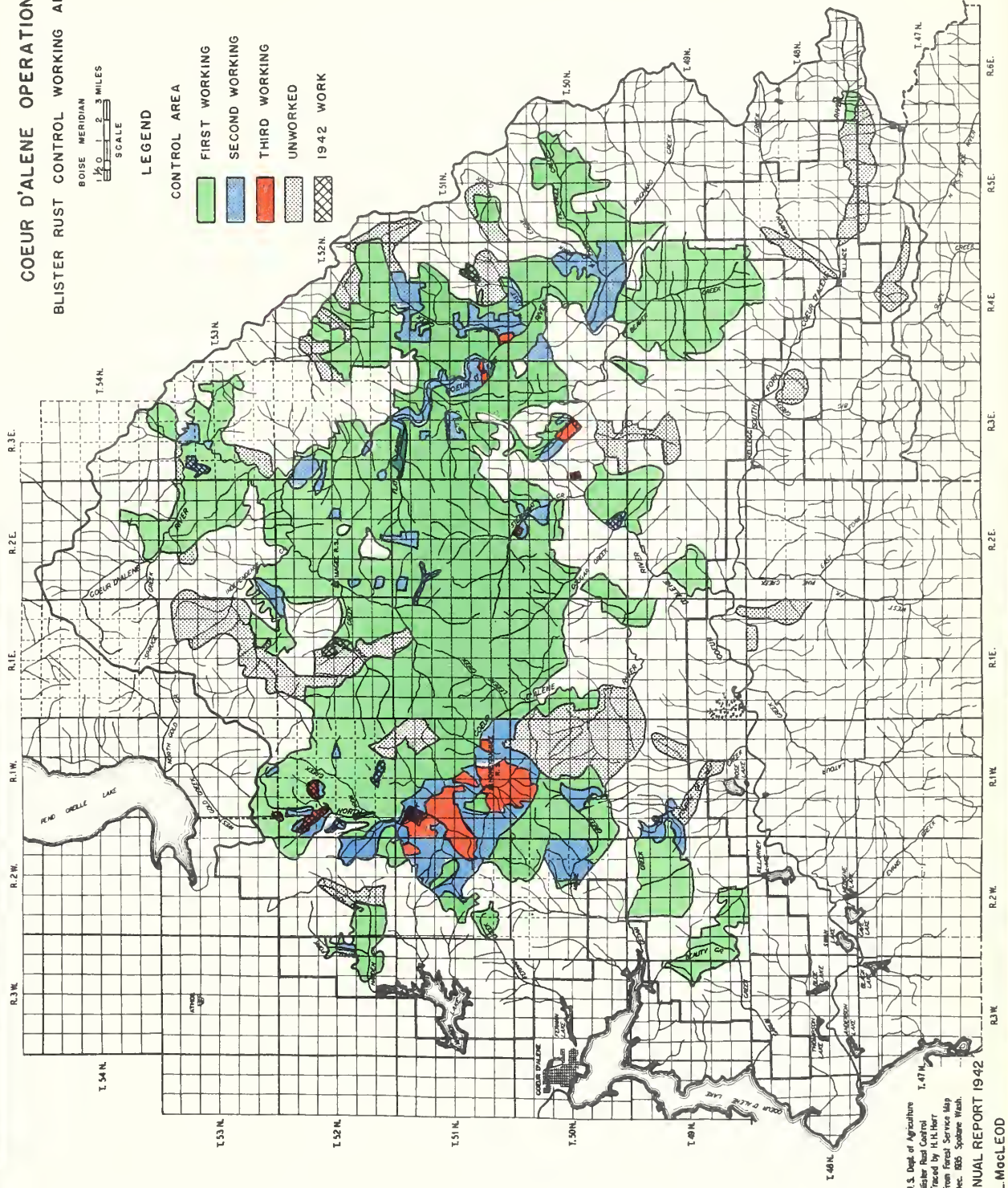
COEUR D'ALENE OPERATION BLISTER RUST CONTROL WORKING AREA

BOISE MERIDIAN
SCALE
1 2 3 MILES

LEGEND

CONTROL AREA

- FIRST WORKING
- SECOND WORKING
- THIRD WORKING
- UNWORKED
- 1942 WORK



U.S. Dept. of Agriculture
Blister Rust Control
Traced by H. H. Herr
From Forest Service Map
Dec. 1935 Spokane Wash.

ANNUAL REPORT 1942

R. L. MacLeod

BLISTER RUST CONTROL WORK, COEUR D'ALENE OPERATION, 1942

By

Robert L. MacLeod, Associate Pathologist

Neal D. Nelson, Assistant Forest Supervisor, U. S. Forest Service

INTRODUCTION

White pine blister rust control work in 1942 was characterized by a shortage of experienced labor and a rapid labor turnover. As this was anticipated, ribes eradication was concentrated for the most part on reproduction and planted areas with the greatest numbers of ribes and on the stream zone in advanced reproduction or pole stands with few ribes in the upland. While this was a sound operating policy from the standpoint of protection it was also advantageous in maintaining close supervision through working crews closer together than is normally necessary.

One 90-man and five 33-man regular camps were operated but throughout most of the season were maintained at less than full strength due to the labor turnover and shortage.

ORGANIZATION AND ADMINISTRATION

The first camp was established on May 11; the others commenced control work between that time and June 23. Closing of camps started coincidentally with the opening of the high schools; the last camp was closed by the middle of September. Owing to the labor situation the rangers were relieved of responsibility for blister rust control which was made a separate project.

Mr. C. J. Pederson was employed as Unit Supervisor with responsibility for camp operation and worked in close cooperation with the Technical Supervisor of the Bureau of Entomology and Plant Quarantine on the technical phases of control.

LOCATION AND DESCRIPTION OF AREAS

The 90-man camp was established on Hudlow Creek. The men were transported by truck to work the Barney Creek plantation, the cutover area on Lewelling Creek and the plantations on controlled burns on Honey, Tom Lavin and Solitaire Creeks. The 33-man camps were located on Trail Creek where the area of initial work was extended; Lost Creek where initial work was started; the head of Ethel Creek to rework the Cathedral Lookout area; at Magee Ranger Station to work the stream zone on Short Creek and at the Steamboat Spike Camp. From the Steamboat Camp two patches of reproduction on Steamboat and Can Creeks were reworked; a stream zone mop-up on Spring, Smith, French, Matt and Falls Creeks placed a large area of dense pole on a maintenance basis; rework on the Scott Creek pruned area was accomplished and the third working was started on Grizzly Creek.

CHECKING

A checking party of four men, working together, performed all of the regular and post check work. These men spent all of their time throughout the season on checking work. Under conditions obtaining in 1942 they were able to perform the regular check as required in various camp areas; intervening periods were spent on post check. Stocking data were taken on all post check strips.

No pine disease survey work was performed in 1942. Timing is important in this phase of the work. Weather conditions in 1941 coupled with the fact that cankers of 1937 and some of 1938 origin were producing aecia made 1941 a favorable year for rust spread and intensification. Much more significance could therefore be attached to the results of survey work performed in the fall of 1943 or later than to the results of any disease work performed in 1942.

ORGANIZATION

Only regular Forest Service camps were established for blister rust control. A peak of 245 men and four checkers were employed in six camps with supervision as follows:

Bureau of Entomology and Plant Quarantine

R. L. MacLeod, Technical
Supervisor

U. S. Forest Service

Neal D. Nelson, Forest Officer
C. J. Pederson, Unit Supervisor

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1942 COEUR D'ALENE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 3,525.13
Forest Service	Regular BLR-4	95,946.18
Total		\$99,471.31

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1942
COEUR D'ALENE OPERATION

Item	Bureau of Entomology and Plant Quarantine	Forest Service	Total
	Regular BLR-1-4	Regular BLR-4	
Sal. perm. men	\$3,388.15	\$ 6,555.00	\$ 9,943.15
Sal. temp. men		10,816.40	10,816.40
Wages, temp. labs.		59,928.52	59,928.52
Subs. supplies		16,159.26	16,159.26
Equipment		174.73	174.73
Travel & transp.	131.92	635.38	767.30
Twine		216.00	216.00
Other Supplies	5.06	1,460.39	1,465.95
Total	\$3,525.13	\$95,946.18	\$99,471.31

TABLE 2A

DISTRIBUTION OF EXPENDITURES BY PROJECTS, 1942
COEUR D'ALENE OPERATION

Project	Expenditures	Number Effective Man-Days	Effective Man-Day Cost
Planning, Coordination and Technical Direction BEPQ Regular BLR-1-4	\$ 3,525.13		
National Forest Lands Forest Service Regular BLR-4	\$95,946.18	7,478	\$12.83

Forest Service

Number meals served	47,238
Average cost per meal	\$0.342
Pounds of twine	1,000

SUMMARY OF RIBES ERADICATION, 1942
COEUR D'ALENE OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Ribes Remaining Per Acre	
							Bushes	Live Stem
Cutover (Prior 1940)	41	210		251	330	19,401	8.4	6.4
Burn (Prior 1940)	270	762		1,032	3,107	474,938	17.1	20.5
Reproduction	639	537	164	1,340	2,333	129,043	2.6	5.5
Pole		19		19	22	201	0	0
All Upland	950	1,528	164	2,642	5,792	623,583	8.8	11.2
Stream (Zone)	164	333		497	1,686	118,835	4.2	10.9
All Types	1,114	1,861	164	3,139	7,478	742,418	7.4	11.1

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
				Man-Days	Ribes	Bushes	Live Stem
Cutover (Prior 1940)	41	25	2,945	.61	72	2.3	1.8
Burn (Prior 1940)	270	1,046	274,709	3.88	1,017	31.4	42.0
Reproduction	639	889	67,939	1.39	106	2.5	4.0
All Upland	950	1,960	345,593	2.06	364	13.9	20.2
Stream (Zone)	164	1,045	85,569	6.37	522	7.6	16.3
All Types	1,114	3,005	431,162	2.70	387	11.5	18.9

TABLE 3B - SECOND WORKING

Cutover (Prior 1940)	210	305	16,456	1.45	78	9.6	7.4
Burn (Prior 1940)	762	2,061	200,229	2.70	263	9.1	8.3
Reproduction	537	1,110	58,038	2.07	108	2.9	5.1
Pole	19	22	201	1.16	11		
All Upland	1,528	3,498	274,924	2.29	180	6.6	6.7
Stream (Zone)	333	641	33,266	1.92	100	2.3	7.8
All Types	1,861	4,139	308,190	2.22	166	5.1	7.1

TABLE 3C - THIRD WORKING

Reproduction	164	334	3,066	2.04	19	1.6	3.2
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TABLE 4

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1942
COEUR D'ALENE OPERATION

State	Working	Number of Acres Worked By Forest Service		
		National Forest	Private	Total
Idaho	First	1,114		1,114
	Second	1,580	281	1,861
	Third	164		164
	Total	2,858	281	3,139

TABLE 5

TOTAL RIBES BY SPECIES ERADICATED, 1942
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inermis	
First	Cutover (Prior 1940)	41	2,272	673		2,945
	Burn (Prior 1940)	270	216,466	58,243		274,709
	Reproduction	639	67,224	713	2	67,939
	All Upland	950	285,962	59,629	2	345,593
	Stream	164	74,714	998	9,857	85,569
	All Types	1,114	360,676	60,627	9,859	431,162
Second	Cutover (Prior 1940)	210	16,055	401		16,456
	Burn (Prior 1940)	762	148,519	51,710		200,229
	Reproduction	537	50,413	7,625		58,038
	Pole	19	31	170		201
	All Upland	1,528	215,018	59,906		274,924
	Stream	333	19,581	438	13,247	33,266
	All Types	1,861	234,599	60,344	13,247	308,190
Third	Reproduction	164	1,665	1,401		3,066
All Workings	Cutover (Prior 1940)	251	18,327	1,074		19,401
	Burn (Prior 1940)	1,032	364,985	109,953		474,938
	Reproduction	1,340	119,302	9,739	2	129,043
	Pole	19	31	170		201
	All Upland	2,642	502,645	120,936	2	623,583
	Stream	497	94,295	1,436	23,104	118,835
	All Types	3,139	596,940	122,372	23,106	742,418

SUMMARY OF RIBES ERADICATION, 1927-1942
COEUR D'ALENE OPERATION

TABLE 6 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes
Cutover (Prior 1940)	11,914	7,539	3,961	23,414	33,854	6,836,117
Burn (Prior 1940)	5,889	1,161		7,050	7,596	1,609,206
Reproduction	83,401	15,600	2,043	101,044	162,198	21,842,784
Pole	66,032	5,801	825	72,658	36,112	5,243,650
Mature	141,857	10,893	1,826	154,576	97,847	15,457,157
Brush	10,555	507		11,062	15,717	2,332,028
Subalpine	485			485	283	76,762
Meadow-Field	157			157		
All Upland	320,290	41,501	8,655	370,446	353,607	53,397,704
Stream (Hand)	13,204	4,429	1,181	18,814	59,270	12,313,781
Stream (Mechanical)	1,123	100		1,223	6,830	634,731
Stream (Zone)	372	2,810		3,182	3,825	346,168
All Stream	14,699	7,339	1,181	23,219	69,925	13,294,680
All Types	334,989	48,840	9,836	393,665	423,532	66,692,384

TABLE 6A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis Man-Days	Ribes
Cutover (Prior 1940)	11,914	16,605	4,448,118	1.39	373
Burn (Prior 1940)	5,889	4,555	1,028,668	.77	175
Reproduction	83,401	133,114	19,743,306	1.60	237
Pole	66,032	31,587	4,519,399	.48	68
Mature	141,857	88,242	14,210,671	.62	100
Brush	10,555	14,983	2,234,161	1.42	212
Subalpine	485	283	76,762	.58	158
Meadow-Field	157				
All Upland	320,290	289,369	46,261,085	.90	144
Stream (Hand)	13,204	48,747	10,965,233	3.69	830
Stream (Mechanical)	1,123	5,956	587,434	5.30	523
Stream (Zone)	372	1,315	141,227	3.53	380
All Stream	14,699	56,018	11,693,894	3.81	796
All Types	334,989	345,387	57,954,979	1.03	173

TABLE 6B - SECOND WORKING

Cutover (Prior 1940)	7,539	11,353	1,837,579	1.51	244
Burn (Prior 1940)	1,161	3,041	580,538	2.62	500
Reproduction	15,600	25,433	1,897,617	1.63	122
Pole	5,801	3,781	611,121	.65	105
Mature	10,893	8,656	1,136,596	.79	104
Brush	507	734	97,867	1.45	193
All Upland	41,501	52,998	6,161,318	1.28	148
Stream (Hand)	4,429	9,154	1,253,205	2.07	283
Stream (Mechanical)	100	874	47,294	8.74	473
Stream (Zone)	2,810	2,510	204,941	.89	73
All Stream	7,339	12,538	1,505,440	1.71	205
All Types	48,840	65,536	7,666,758	1.34	157

TABLE 6C - THIRD WORKING

Cutover (Prior 1940)	3,961	5,896	550,420	1.49	139
Reproduction	2,043	3,651	201,861	1.79	99
Pole	825	744	113,130	.90	137
Mature	1,826	949	109,890	.52	60
All Upland	8,655	11,240	975,301	1.30	113
Stream (Hand)	1,181	1,369	95,346	1.16	81
All Types	9,836	12,609	1,070,647	1.28	109

TABLE 7

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1927-1942
COEUR D'ALENE OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
					Man-Days	Ribes
First	EQ-Reg.	25,776	8,351	2,846,383	.32	110
	EQ-Emerg.	40,997	35,497	6,584,066	.87	161
	FS-Reg.	40,385	44,597	8,802,599	1.10	218
	FS-Emerg.	102,088	78,912	16,462,983	.77	161
	CCC	125,743	178,030	23,258,948	1.42	185
	Total	334,989	345,387	57,954,979	1.03	173
Second	EQ-Emerg.	42	44	5,151	1.05	123
	FS-Reg.	21,215	23,289	4,057,497	1.10	191
	FS-Emerg.	9,136	7,735	1,132,792	.85	124
	CCC	18,447	34,468	2,471,318	1.87	134
	Total	48,840	65,536	7,666,758	1.34	157
Third	FS-Reg.	5,268	4,855	631,056	.92	120
	FS-Emerg.	487	250	24,398	.51	50
	CCC	4,081	7,504	415,193	1.84	102
	Total	9,836	12,609	1,070,647	1.28	109
All Workings	EQ-Reg.	25,776	8,351	2,846,383	.32	110
	EQ-Emerg.	41,039	35,541	6,589,217	.87	161
	FS-Reg.	66,868	72,741	13,491,152	1.09	202
	FS-Emerg.	111,711	86,897	17,620,173	.78	158
	CCC	148,271	220,002	26,145,459	1.48	176
	Total	393,665	423,532	66,692,384	1.08	169

TABLE 8

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1927-1942
COEUR D'ALENE OPERATION

Working	Number of Acres Worked				
	Federal	Other			Total
	National Forest	State	Private	Total	
First	314,180	5,659	15,150	20,809	334,989
Second	45,086	530	3,224	3,754	48,840
Third	8,743	200	893	1,093	9,836
All Workings	368,009	6,389	19,267	25,656	393,665

TABLE 9

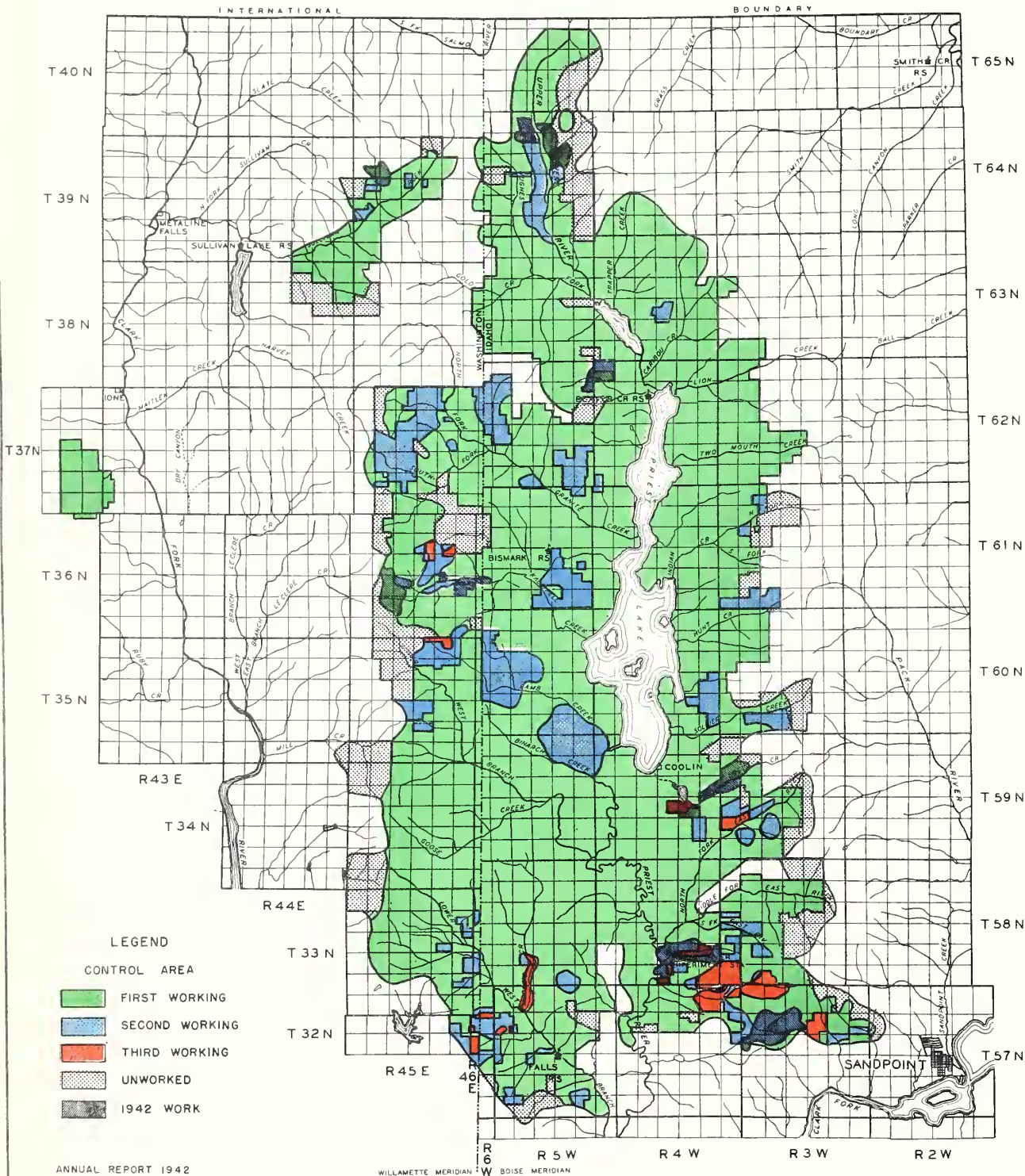
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1927-1942
COEUR D'ALENE OPERATION

Ownership Class	Number of Acres			Acres on Which Working Is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
National Forest	314,180	33,522	347,702	10,303	358,005
Public Domain		2,110	2,110		2,110
Subtotal Federal	314,180	35,632	349,812	10,303	360,115
State	5,659	1,171	6,830		6,830
Private	15,150	8,349	23,499	5,151	28,650
Subtotal Other	20,809	9,520	30,329	5,151	35,480
Total	334,989	45,152	380,141	15,454	395,595

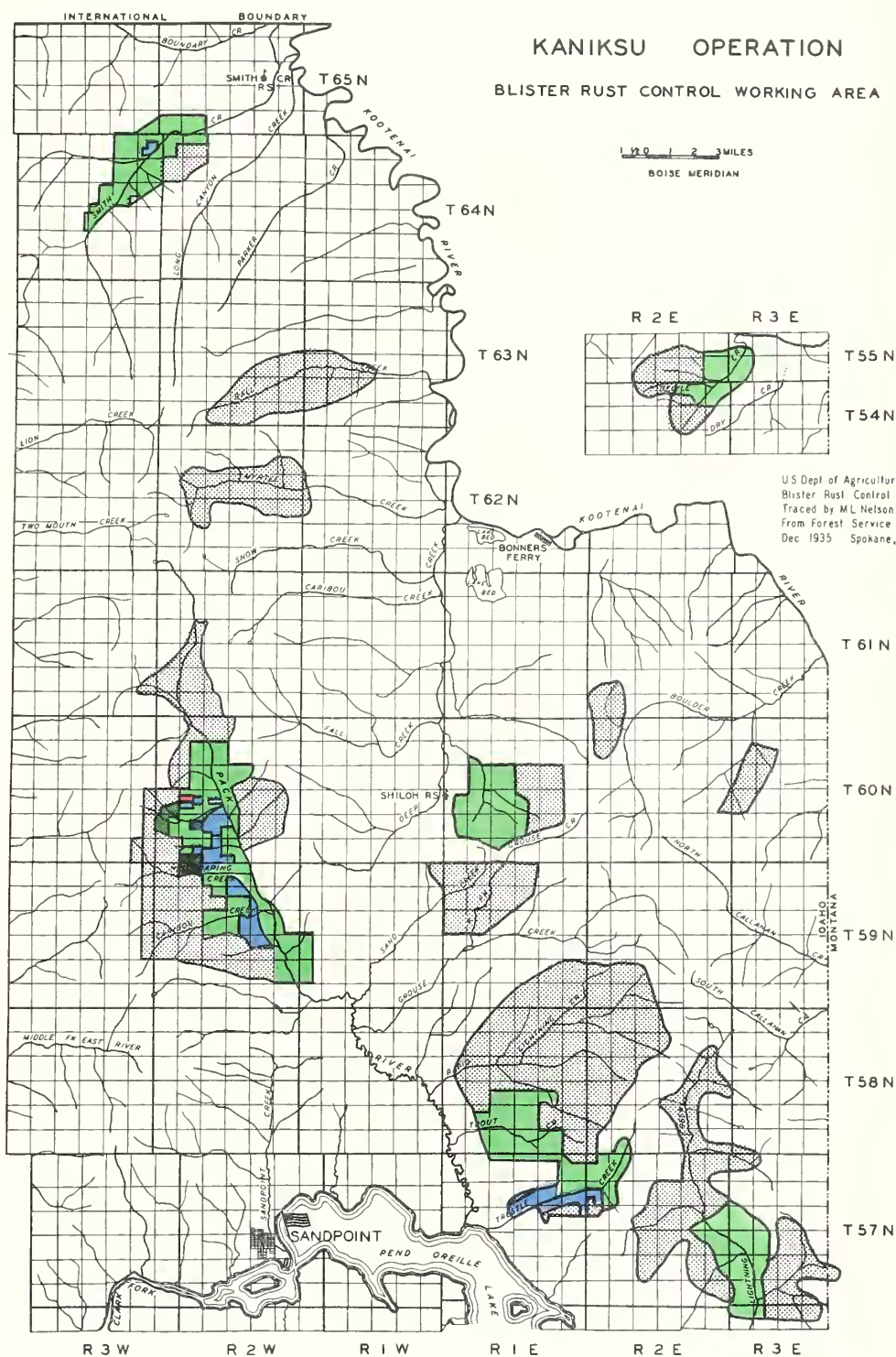
TABLE 10

TOTAL RIBES BY SPECIES ERADICATED, 1927-1942
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Cutover (Prior 1940)	11,914	3,050,950	1,352,046	1	17,536	27,585	4,448,118
	Burn (Prior 1940)	5,889	561,147	448,567		13,530	5,424	1,028,668
	Reproduction	83,401	11,777,963	7,357,154	2,227	504,581	101,381	19,743,306
	Pole	66,032	2,651,127	1,799,863	12,246	12,823	43,340	4,519,399
	Mature	141,857	11,053,700	2,917,046	1	89,402	150,522	14,210,671
	Brush	10,555	778,322	1,424,834		25,748	5,257	2,234,161
	Subalpine	485	55,561	21,201				76,762
	Meadow-Field	157						
	All Upland	320,290	29,928,770	15,320,711	14,475	663,620	333,509	46,261,085
	Stream	14,699	7,182,011	193,127	31,474	4,228,895	68,387	11,693,894
Second	All Types	334,989	37,110,781	15,503,838	45,949	4,892,515	401,896	57,954,979
	Cutover (Prior 1940)	7,539	1,417,735	403,334		13,430	3,080	1,837,579
	Burn (Prior 1940)	1,161	410,973	169,565				580,538
	Reproduction	15,600	1,033,669	842,295		12,818	8,835	1,897,617
	Pole	5,801	477,739	124,199	4,736	3,882	565	611,121
	Mature	10,893	819,635	301,535		11,089	4,337	1,136,596
	Brush	507	11,517	86,350				97,867
	All Upland	41,501	4,171,268	1,927,278	4,736	41,219	16,817	6,161,318
	Stream	7,339	1,046,088	43,715		409,636	6,001	1,505,440
	All Types	48,840	5,217,356	1,970,993	4,736	450,855	22,818	7,666,758
Third	Cutover (Prior 1940)	3,961	471,005	79,415				550,420
	Reproduction	2,043	131,165	69,629		1,067		201,861
	Pole	825	102,407	10,723				113,130
	Mature	1,826	95,320	14,570				109,890
	All Upland	8,655	799,897	174,337		1,067		975,301
	Stream	1,181	67,556	113		27,677		95,346
	All Types	9,836	867,453	174,450		28,744		1,070,647
All Workings	Cutover (Prior 1940)	23,414	4,939,690	1,834,795	1	30,966	30,665	6,836,117
	Burn (Prior 1940)	7,050	972,120	618,132		13,530	5,424	1,609,206
	Reproduction	101,044	12,942,797	8,269,078	2,227	518,466	110,216	21,842,784
	Pole	72,658	3,231,273	1,934,785	16,982	16,705	43,905	5,243,650
	Mature	154,576	11,968,655	3,233,151	1	100,491	154,859	15,457,157
	Brush	11,062	789,839	1,511,184		25,748	5,257	2,332,028
	Subalpine	485	55,561	21,201				76,762
	Meadow-Field	157						
	All Upland	370,446	34,899,935	17,422,326	19,211	705,906	350,326	53,397,704
	Stream	23,219	8,295,655	226,955	31,474	4,666,208	74,388	13,294,680
All Types		393,665	43,195,590	17,649,281	50,685	5,372,114	424,714	66,692,384



BLISTER RUST CONTROL WORKING AREA



BLISTER RUST CONTROL WORK, KANIKSU OPERATION, 1942

By

Frank O. Walters, Associate Pathologist
Harold A. Brischle, Assistant Pathologist

INTRODUCTION

Included within the scope of the Kaniksu operation are the lands of the Kaniksu National Forest, the Priest Lake Timber Protective Association and portions of the Pend Oreille Timber Protective Association. The area included represents that portion of Idaho lying north of Pend Oreille Lake and the principal white pine growing areas of eastern Washington. The Forest Service program consisted of seven camps, varying in size from 12 to 50 men, financed by regular appropriations. The Bureau of Entomology and Plant Quarantine maintained two camps varying in size from 30 to 50 men on a co-operative basis between the federal government, the state of Idaho and the Priest Lake Timber Protective Association.

In October, a party of Forest Service representatives from Region Six spent three days on the operation studying various phases of the control work as well as the silvicultural aspects of the blister rust work.

ORGANIZATION AND ADMINISTRATION

Kalispell Bay served as the headquarters for the Forest Service and the Bureau. Subsistence supplies and equipment were dispatched from this headquarters to the individual camps. Deliveries to isolated camps were made by boat and pack stock. Other camps were serviced by truck.

The blister rust control field organization was as follows:

Bureau of Entomology and Plant Quarantine

U. S. Forest Service

F. O. Walters, Technical Supervisor
H. A. Brischle, Assistant Operation Supervisor in charge of checking
L. J. Easley, Unit Supervisor

F. O. Walters, Forest Service
W. D. McKee, Unit Supervisor

<u>Program</u>	<u>Number Camps</u>	<u>Number Workers</u>	<u>Number Checkers</u>
EQ-Cooperative	2	80	2
FS-Regular	7	271	4
Total number employed on blister rust control - 357			

The first camp opened May 3, the last one June 18. Most of the camps were closed by September 1. One small crew continued until mid-October with stream type eradication.

Due to demands of the war industries suitable labor was difficult to secure. In addition, adverse weather conditions during the first part of the field season combined to make the labor situation even more acute. As a result, accomplishment was far behind normal schedule. These factors together with an increased wage scale and a considerable advance in food costs contributed to an increase in man-day costs.

LOCATION AND DESCRIPTION OF AREAS

The Forest Service camps were located as follows: Kalispell Creek, Jeru Creek, Hellroaring Creek, Sullivan Creek, Beaver Creek, Upper Priest River and the Priest River Experiment Station. The Bureau cooperative camps were located in Big Creek and Lost Creek.

Jeru Creek, Hellroaring Creek, Sullivan Creek and parts of Beaver Creek and Kalispell Creek represented difficult working conditions. Big Creek presented a seedling problem. Other areas could be considered light to medium with regard to working conditions.

METHODS AND EQUIPMENT

In general, standard methods were used. Close supervision was necessary and more straw bosses were used than has been the practice in the past. A portable kitchen mounted on a truck chassis was used for a mobile 10-man crew working on stream type eradication. The crew was thus easily and quickly moved from one point to another. A training program for developing competent crew leaders was worked out and showed considerable promise. An expansion of the idea is planned for next season.

CONTROL STATUS

On the Kaniksu operation a total of 464,397 acres have been covered by the eradication crews. Of this acreage 221,803 acres have been placed on a maintenance basis, 91,486 acres are considered in need of rework and 151,108 acres are up for post check.

Infection conditions are more severe in Soldier Creek, Tunnel Creek, North Fork of Big Creek and the South Fork of Granite Creek than any of the other areas.

CHECKING AND PINE DISEASE SURVEY

During the field season regular check was made on 10,353 acres at a cost of \$0.198 per acre. In September and October Forest Service and Bureau personnel conducted a post check and pine disease survey on areas in the Priest Lake drainage. To carry on this work a camp was established at Navigation Ranger Station on Upper Priest Lake and later moved to Beaver Creek Ranger Station on the lower lake. Approximately 93 man-days were used in the field and in the compilation of data. A total of 43.7 miles of strip was run. The results of the survey are summarized as follows:

1. Flow Boy Mountain, T. 63 N., R. 4 W., secs. 19, 29, 30, 31, 32 (partial)

Acres in area (ribes eradication by ERA in 1936)	1,386
Miles of survey strip	8.7
Number trees examined	1,484
Number trees infected	14
Per cent trees infected	1.0
Number cankers found	16
Regular check 1936, ribes per acre - 7 bushes, 8 F.L.S.	
Post check 1942, ribes per acre - 11 bushes, 30 F.L.S.	

The 14 cankers found were about equally divided, occurring on 1936, 1937 and 1938 wood. Portions of this area should be reworked in 1943.

2. Trapper Creek, T. 63 N., R. 4 and 5 W., secs. 7, 12, 13, 18, 19 (partial)

Acres in area (ribes eradication in 1932)	1,360
Miles of survey strip	8.5
Number trees examined	1,687
Number trees infected	36
Per cent trees infected	2.1
Number cankers found	102
Post check in 1936, ribes per acre - 1 bush, 1 F.L.S.	
Post check in 1942, ribes per acre - 1 bush, 1 F.L.S.	

The post check in 1936 and the pine disease survey in 1942 indicate very few ribes on the upland portions of the area. By reworking the stream type along main Trapper Creek and its tributaries and approximately 150 acres of open reproduction in sections 5 and 6, most of the Trapper Creek drainage can be placed on maintenance.

3. Ruby Creek, T. 63 N., R. 5 W., secs. 1, 2, 12 (partial)

Acres in area (unworked)	15
Miles of survey strip	1.9
Number trees examined	603
Number trees infected	10
Per cent trees infected	1.7
Number cankers found	11
Post check 1942, ribes per acre - 10 bushes, 138 F.L.S.	

The disease survey was made along each side of the main creek. In spite of these numerous ribes the infection was light. The stand consists largely of white pine pole and some reproduction going into the pole stage. Due to the large number of ribes present and the fine stand of young white pine timber, a trail should be put into the drainage and the area worked in the near future.

4. Boulder Creek, T. 63 N., R. 5 W., secs. 21, 22, 23, 27, 28 (partial)

Acres in area (ribes eradication by ERA in 1936)	430
Miles of survey strip	1.9
Number trees examined	1,956
Number trees infected	18
Per cent trees infected	0.9
Number cankers found	26
Regular check 1936, ribes per acre - 0 bushes, 0 F.L.S.	
Post check 1942, ribes per acre - 1 bush, 4 F.L.S.	

In 1936 a large part of the area was eliminated as ribes-free. A small amount of stream type work should put this area on a maintenance basis.

5. Beaver Creek, T. 62 N., R. 4 W., secs. 1, 11, 12, 14, 18, 19 (partial)

Acres in area (ribes eradication by ERA in 1936)	1,137
Miles of survey strip	10.2
Number trees examined	1,967
Number trees infected	46
Per cent trees infected	2.3
Number cankers found	46
Regular check 1936, ribes per acre - 2 bushes, 4 F.L.S.	
Post check 1942, ribes per acre - 4 bushes, 35 F.L.S.	

The control area in the Beaver Creek drainage was largely burned over in 1925. White pine reproduction and the reproduction of ribes over most of the area have been heavy. Dead down timber and brush have made it a difficult area to work. Some initial work and rework in this drainage should be completed as soon as possible, preferably in 1943.

6. Caribou Creek, T. 63 N., R. 4 W., secs. 3, 26, 34, 35, 36 (partial)

Acres in area (ribes eradication by ERA in 1936, state cooperative crews 1938)	800
Miles of survey strip	7.2
Number trees examined	4,403
Number trees infected	147
Per cent trees infected	3.3
Number cankers found	192
Regular checks 1936 and 1938, ribes per acre - 1 bush, 1 F.L.S.	
Post check 1942, ribes per acre - 6 bushes, 41 F.L.S.	

Portions of this area should be given rework as soon as possible, preferably in 1943.

7. Bear Creek, T. 61 N., R. 4 W., secs. 2, 3, 11, 14 (partial)

Acres in area (ribes eradication by state cooperative crews in 1935)	720
Miles of survey strip	5.3
Number trees examined	4,165
Number trees infected	61
Per cent trees infected	1.5
Number cankers found	83
Regular check 1935, ribes per acre - 1 bush, 2 F.L.S.	
Post check 1942, ribes per acre - 2 bushes, 8 F.L.S.	

This area was largely burned over in 1925, and the reproduction of white pine since has been favorable. There are also some ribes in stream type that are not included in the 1942 survey.

This area should be worked in the near future after which much of it could be placed on maintenance.

CANKER ELIMINATION

The canker elimination work as described in last year's annual report was continued as far into the winter as weather conditions permitted. A total of 2,334 acres was covered, and 829,142 trees were treated with an expenditure of 2,049 man-days. Inspection of the work in 1942 indicated that there was little excessive "bleeding," and no apparent setback to the treated trees was visible. While some cankers were missed, it appeared that the work was successful in saving an adequate stocking of white pine on the areas treated.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperating agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1942 KANIKSU OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 7,590.61
	Regular BLR-3-4	9,463.52
	Subtotal	17,054.13
State of Idaho	State BLR-3-4	9,085.86
Priest Lake Timber Protective Association	Private BLR-3-4	4,240.44
	Subtotal	13,326.30
Forest Service	Regular BLR-4	92,570.31
Total		\$122,950.74

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1942
KANIKSU OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$4,572.50			\$ 4,572.50	\$ 2,740.16	\$ 7,312.66
Sal. temp. men	705.33	\$2,002.64	\$ 1,299.89	4,007.86	11,832.43	15,840.29
Wages, temp. labs.	235.04	3,639.90	11,948.37	15,823.31	54,551.84	70,375.15
Subs. supplies	871.13	3,378.85	78.04	4,328.02	17,764.21	22,092.23
Equipment	15.38			15.38	2,220.33	2,235.71
Trucks					579.39	579.39
Travel & transp.	397.65	251.04		648.69	1,065.64	1,714.33
Twine					884.68	884.68
Other supplies	793.58	191.09		984.67	931.63	1,916.30
Total	\$7,590.61	\$9,463.52	\$13,326.30	\$30,380.43	\$92,570.31	\$122,950.74

TABLE 2A

DISTRIBUTION OF EXPENDITURES BY PROJECTS, 1942
KANIKSU OPERATION

Project	Expenditures	Number Effective Man-Days	Effective Man-Day Cost
Planning, Coordination and Technical Direction BEPQ Regular BLR-1-4	\$ 7,590.61		
Cooperative - State and Private Lands BEPQ Regular BLR-3-4	9,463.52	2,702	\$ 8.43
State of Idaho BLR-3-4	9,085.86		
PLTPA BLR-3-4	4,240.44		
Total	22,789.82		
National Forest Lands Forest Service Regular BLR-4	92,570.31	6,711	\$13.79

	<u>Bureau</u>	<u>Forest Service</u>
Number meals served	15,235	51,551
Average cost per meal	\$0.239	\$0.345
Pounds of twine	475	1,175

SUMMARY OF RIBES ERADICATION, 1942
KANIKSU OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Ribes Remaining Per Acre	
							Bushes	Live Stem
Cutover (Prior 1940)	181	2,206	89	2,476	2,053	563,479	19	32
Reproduction	1,708	1,797	725	4,230	3,518	669,464	5	17
Pole	1,475	2,012	454	3,941	3,199	407,725	4	8
Mature	116	347		463	154	33,635	6	9
Brush		92	115	207	76	2,312	1	3
Subalpine		60		60	12	12,019		
All Upland	3,480	6,514	1,383	11,377	9,012	1,688,634	8	14
Stream (Hand)	23	217	157	397	401	33,055	4	7
All Types	3,503	6,731	1,540	11,774	9,413	1,721,689	7	11

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
				Man-Days	Ribes	Bushes	Live Stem
Cutover (Prior 1940)	181	427	253,801	2.36	1,402	31	32
Reproduction	1,708	2,179	595,264	1.28	349	6	9
Pole	1,475	2,274	288,211	1.54	195	5	15
Mature	116	36	2,758	.31	24	9	20
All Upland	3,480	4,916	1,140,034	1.41	328	7	13
Stream (Hand)	23	48	2,975	2.09	129	1	1
All Types	3,503	4,964	1,143,009	1.42	326	6	12

TABLE 3B - SECOND WORKING

Cutover (Prior 1940)	2,206	1,602	305,214	.73	138	18	32
Reproduction	1,797	1,118	62,960	.62	35	4	9
Pole	2,012	748	99,679	.37	50	3	4
Mature	347	118	30,877	.34	89	5	5
Brush	92	13	544	.14	6		
Subalpine	60	12	12,019	.20	200		
All Upland	6,514	3,611	511,293	.55	78	8	15
Stream (Hand)	217	253	24,298	1.17	112	5	8
All Types	6,731	3,864	535,591	.57	80	8	14

TABLE 3C - THIRD WORKING

Cutover (Prior 1940)	89	24	4,464	.28	50	9	33
Reproduction	725	221	11,240	.30	16	10	25
Pole	454	177	19,835	.39	44	5	3
Brush	115	63	1,768	.55	15	1	5
All Upland	1,383	485	37,307	.35	27	6	13
Stream (Hand)	157	100	5,782	.64	37	10	29
All Types	1,540	585	43,089	.38	28	6	13

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1942
KANIKSU OPERATION

State	Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
						Man-Days	Ribes	Bushes	Live Stem
Idaho	First	EQ-Coop.	269	525	270,882	1.95	1,007	23	32
		FS-Reg.	1,947	2,114	187,370	1.14	101	5	15
		Total	2,116	2,639	458,252	1.25	217	7	17
	Second	EQ-Coop.	2,684	2,053	353,923	.76	132	16	30
		FS-Reg.	3,249	1,382	151,098	.43	47	1	3
		Total	5,933	3,435	505,021	.58	85	8	15
	Third	EQ-Coop.	253	124	11,624	.49	46	13	36
		FS-Reg.	1,287	461	31,465	.36	24	4	5
		Total	1,540	585	43,089	.38	28	7	10
	All Workings	EQ-Coop.	3,206	2,702	636,429	.84	199	17	30
		FS-Reg.	6,383	3,957	369,933	.62	58	3	7
		Total	9,589	6,659	1,006,362	.69	105	7	17
Washington	First	FS-Reg.	1,387	2,325	684,757	1.68	494	5	5
	Second	FS-Reg.	798	429	30,570	.54	39	4	7
	All Workings	FS-Reg.	2,185	2,754	715,327	1.26	327	5	6
Idaho and Washington	First	EQ-Coop.	269	525	270,882	1.95	1,007	23	32
		FS-Reg.	3,234	4,439	872,127	1.37	270	5	10
		Total	3,503	4,964	1,143,009	1.42	326	6	12
	Second	EQ-Coop.	2,684	2,053	353,923	.76	132	16	30
		FS-Reg.	4,047	1,811	181,668	.45	45	2	3
		Total	6,731	3,864	535,591	.57	80	8	14
	Third	EQ-Coop.	253	124	11,624	.49	46	13	36
		FS-Reg.	1,287	461	31,465	.36	24	4	5
		Total	1,540	585	43,089	.38	28	7	10
	All Workings	EQ-Coop.	3,206	2,702	636,429	.84	199	17	30
		FS-Reg.	8,568	6,711	1,085,260	.78	127	3	4
		Total	11,774	9,413	1,721,689	.80	146	8	14

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1942
KANIKSU OPERATION

State	Working	Number of Acres Worked									
		By Forest Service			By Bureau of Entomology and Plant Quarantine			Total			
		National Forest	Private	Total	State	Private	Total	National Forest	Other		Total
									State	Private	
Idaho	First	1,847		1,847	269		269	1,847	269		2,116
	Second	3,199	50	3,249	2,488	196	2,684	3,199	2,498	246	5,933
	Third	1,287		1,287	98	155	253	1,287	98	155	1,540
	Total	6,333	50	6,383	2,855	351	3,206	6,333	2,855	401	9,589
Washington	First	1,387		1,387				1,387			1,387
	Second	798		798				798			798
	Total	2,185		2,185				2,185			2,185
Total	First	3,234		3,234	269		269	3,234	269		3,503
	Second	3,997	50	4,047	2,488	196	2,684	3,997	2,498	246	6,731
	Third	1,287		1,287	98	155	253	1,287	98	155	1,540
	Total	8,518	50	8,568	2,855	351	3,206	8,518	2,855	401	11,774

TABLE 6
TOTAL RIBES BY SPECIES ERADICATED, 1942
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Cutover (Prior 1940)	181	40,581	213,220		253,801
	Reproduction	1,708	141,772	453,492		595,264
	Pole	1,475	132,195	156,016		288,211
	Mature	116	2,642	116		2,758
	All Upland	3,480	317,190	822,844		1,140,034
	Stream	23	1,508	1,467		2,975
	All Types	3,503	318,698	824,311		1,143,009
Second	Cutover (Prior 1940)	2,206	176,937	127,977	300	305,214
	Reproduction	1,797	26,019	35,739	1,202	62,960
	Pole	2,012	31,889	67,420	370	99,679
	Mature	347	15,756	15,121		30,877
	Brush	92	529	15		544
	Subalpine	60	8,124	3,895		12,019
	All Upland	6,514	259,254	250,167	1,872	511,293
	Stream	217	19,825	4,168	305	24,298
Third	All Types	6,731	279,079	254,335	2,177	535,591
	Cutover (Prior 1940)	89	1,456	3,008		4,464
	Reproduction	725	8,479	1,637	1,124	11,240
	Pole	454	6,235	13,475	125	19,835
	Brush	115	718	1,026	24	1,768
	All Upland	1,383	16,888	19,146	1,273	37,307
	Stream	157	4,107	1	1,674	5,782
All Workings	All Types	1,540	20,995	19,147	2,947	43,089
	Cutover (Prior 1940)	2,476	218,974	344,205	300	563,479
	Reproduction	4,230	176,270	490,868	2,326	669,464
	Pole	3,941	170,319	236,911	495	407,725
	Mature	463	18,398	15,237		33,635
	Brush	207	1,247	1,041	24	2,312
	Subalpine	60	8,124	3,895		12,019
	All Upland	11,377	593,332	1,092,157	3,145	1,688,634
	Stream	397	25,440	5,636	1,979	33,055
	All Types	11,774	618,772	1,097,793	5,124	1,721,689

SUMMARY OF RIBES ERADICATION 1923-1942
KANIKSU OPERATION

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes
Cutover (Prior 1940)	8,364	4,614	140	13,118	11,227	3,184,091
Burn (Prior 1940)	1,132			1,132	1,354	947,874
Reproduction	163,752	33,748	6,638	204,138	149,727	37,075,018
Pole	121,779	16,456	475	138,710	49,762	6,639,773
Mature	141,657	5,463	105	147,225	33,058	6,108,597
Brush	3,599	688	179	4,466	1,586	367,519
Subalpine	1,933	110		2,043	1,044	169,129
Meadow-Field	71	10		81	1	72
All Upland	442,287	61,089	7,537	510,913	247,759	54,492,073
Stream (Hand)	20,604	5,198	523	26,325	45,807	9,251,497
Stream (Mechanical)	1,606			1,606	12,075	902,076
All Stream	22,210	5,198	523	27,931	57,882	10,153,573
All Types	464,497	66,287	8,060	538,844	305,641	64,645,646

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis Man-Days	Ribes
Cutover (Prior 1940)	8,364	4,712	1,420,271	.56	170
Burn (Prior 1940)	1,132	1,354	947,874	1.20	837
Reproduction	163,752	113,242	31,519,188	.69	192
Pole	121,779	42,392	6,016,717	.35	49
Mature	141,657	30,191	5,773,779	.21	41
Brush	3,599	1,104	336,107	.31	93
Subalpine	1,933	1,019	156,522	.53	81
Meadow-Field	71				
All Upland	442,287	194,014	46,170,458	.44	104
Stream (Hand)	20,604	36,802	8,257,111	1.79	401
Stream (Mechanical)	1,606	12,075	902,076	7.52	562
All Stream	22,210	48,877	9,159,187	2.20	412
All Types	464,497	242,891	55,329,645	.52	119

TABLE 7B - SECOND WORKING

Cutover (Prior 1940)	4,614	6,446	1,749,650	1.40	379
Reproduction	33,748	29,459	4,754,939	.87	141
Pole	16,456	7,184	603,127	.44	37
Mature	5,463	2,792	333,434	.51	61
Brush	688	360	28,386	.52	41
Subalpine	110	25	12,607	.23	115
Meadow-Field	10	1	72	.10	7
All Upland	61,089	46,267	7,482,215	.76	122
Stream (Hand)	5,198	8,434	959,554	1.62	185
All Types	66,287	54,701	8,441,769	.83	127

TABLE 7C - THIRD WORKING

Cutover (Prior 1940)	140	69	14,170	.49	101
Reproduction	6,638	7,026	800,891	1.06	121
Pole	475	186	19,929	.39	42
Mature	105	75	1,384	.71	13
Brush	179	122	3,026	.68	17
All Upland	7,537	7,478	839,400	.99	111
Stream (Hand)	523	571	34,832	1.09	67
All Types	8,060	8,049	874,232	1.00	108



TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1927-1942
KANIKSU OPERATION

State	Working	Class	Acres	Effective Men-Days	Total Ribes	Per Acre Basis	
						Man-Days	Ribes
Idaho	First	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		EQ-Coop.	111,419	31,454	9,021,754	.28	81
		EQ-Emerg.	80,596	48,602	8,318,777	.60	103
		FS-Reg.	12,992	19,591	2,992,203	1.51	230
		FS-Emerg.	87,988	34,005	8,313,023	.39	94
		CCC	54,536	37,126	6,588,494	.68	121
		Total	366,327	177,612	36,300,945	.48	99
	Second	EQ-Coop.	7,639	5,681	807,835	.74	106
		EQ-Emerg.	14,337	14,806	2,637,381	1.03	184
		FS-Reg.	10,355	4,728	674,505	.46	65
		FS-Emerg.	11,281	4,818	475,451	.43	42
		CCC	7,883	13,352	1,863,341	1.69	236
		Total	51,495	43,385	6,458,513	.84	125
	Third	EQ-Coop.	1,631	1,448	361,706	.89	222
		EQ-Emerg.	4,108	5,443	377,339	1.32	92
		FS-Reg.	1,496	590	49,409	.39	33
		Total	7,235	7,481	788,454	1.03	109
	All Workings	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		EQ-Coop.	120,689	38,583	10,191,300	.32	84
		EQ-Emerg.	99,041	68,851	11,333,497	.70	114
		FS-Reg.	24,843	24,899	3,716,117	1.00	150
		FS-Emerg.	99,269	38,823	8,788,474	.39	89
		CCC	62,419	50,478	8,451,835	.81	135
		Total	425,057	228,478	43,547,912	.54	102
Washington	First	EQ-Emerg.	30,061	17,555	6,539,175	.58	218
		FS-Reg.	13,951	13,590	5,376,625	.97	385
		FS-Emerg.	34,417	12,708	3,858,496	.37	112
		CCC	19,741	21,426	3,254,404	1.09	165
		Total	98,170	65,279	19,028,700	.66	194
	Second	EQ-Emerg.	1,376	1,381	204,383	1.00	149
		FS-Reg.	8,880	4,978	1,391,280	.56	157
		FS-Emerg.	1,949	1,678	154,764	.86	79
		CCC	2,587	3,279	232,829	1.27	90
		Total	14,792	11,316	1,983,256	.77	134
	Third	EQ-Emerg.	192	352	10,513	1.83	55
		FS-Reg.	633	216	75,265	.34	119
		Total	825	568	85,778	.69	104
	All Workings	EQ-Emerg.	31,629	19,288	6,754,071	.61	214
		FS-Reg.	23,464	18,784	6,843,170	.80	292
		FS-Emerg.	36,366	14,386	4,013,260	.40	110
		CCC	22,328	24,705	3,487,233	1.11	156
		Total	113,787	77,163	21,097,734	.68	185
Idaho and Washington	First	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		EQ-Coop.	111,419	31,454	9,021,759	.28	81
		EQ-Emerg.	110,657	66,157	14,857,952	.60	134
		FS-Reg.	26,945	33,171	8,368,828	1.23	311
		FS-Emerg.	122,405	46,713	12,171,519	.58	99
		CCC	74,277	58,552	9,842,898	.79	133
		Total	464,497	242,891	55,329,645	.52	119
	Second	EQ-Coop.	7,639	5,681	807,835	.74	106
		EQ-Emerg.	15,713	16,187	2,841,764	1.03	181
		FS-Reg.	19,235	9,706	2,065,785	.50	107
		FS-Emerg.	13,230	6,496	630,215	.49	48
		CCC	10,470	16,631	2,096,170	1.59	200
		Total	66,287	54,701	8,441,769	.83	127
	Third	EQ-Coop.	1,631	1,448	361,706	.89	222
		EQ-Emerg.	4,300	5,795	387,852	1.35	90
		FS-Reg.	2,129	806	124,674	.38	59
		Total	8,060	8,049	874,232	1.00	108
	All Workings	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		EQ-Coop.	120,689	38,583	10,191,300	.32	84
		EQ-Emerg.	130,670	88,139	18,087,568	.67	138
		FS-Reg.	48,307	43,683	10,559,287	.90	219
		FS-Emerg.	135,635	53,209	12,801,734	.39	94
		CCC	84,747	75,183	11,939,068	.89	141
		Total	538,844	305,641	64,645,646	.57	120

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1942
KANIKSU OPERATION

State	Working	Number of Acres Worked						
		Federal			Other			Total
		National Forest	Public Domain	Total	State	Private	Total	
Idaho	First	186,826	54	186,880	111,185	68,262	179,447	366,327
	Second	27,460		27,460	15,449	8,586	24,035	51,495
	Third	1,391		1,391	4,876	968	5,844	7,235
	Total	215,677	54	215,731	131,510	77,816	209,326	425,057
Washington	First	69,440		69,440	2,080	26,650	28,730	98,170
	Second	13,748		13,748		1,044	1,044	14,792
	Third	633		633		192	192	825
	Total	83,821		83,821	2,080	27,886	29,966	113,787
Idaho and Washington	First	256,266	54	256,320	113,265	94,912	208,177	464,497
	Second	41,208		41,208	15,449	9,630	25,079	66,287
	Third	2,024		2,024	4,876	1,160	6,036	8,060
	Total	299,498	54	299,552	133,590	105,702	239,292	538,844

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1942
KANIKSU OPERATION

State	Ownership Class	Number of Acres			Acres on Which Working is Deferred	Total Acres White Pine
		Worked	Unworked	Total		
Idaho	National Forest	186,826	41,857	228,683	26,202	254,885
	Public Domain	54	506	560		560
	Subtotal Federal	186,880	42,363	229,243	26,202	255,445
	State	111,185	17,255	128,440	30	128,470
	Private	68,262	44,058	112,320	5,390	117,710
	Subtotal Other	179,447	61,313	240,760	5,420	246,180
	Total	366,327	103,676	470,003	31,622	501,625
Washington	National Forest	69,440	29,870	99,310		99,310
	State	2,080	2,030	4,110		4,110
	Private	26,650	11,575	38,225		38,225
	Subtotal Other	28,730	13,605	42,335		42,335
	Total	98,170	43,475	141,645		141,645
Idaho and Washington	National Forest	256,266	71,727	327,993	26,202	354,195
	Public Domain	54	506	560		560
	Subtotal Federal	256,320	72,233	328,553	26,202	354,755
	State	113,265	19,285	132,550	30	132,580
	Private	94,912	55,633	150,545	5,390	155,935
	Subtotal Other	208,177	74,918	283,095	5,420	288,515
	Total	464,497	147,151	611,648	31,622	643,270



TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1923-1942
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	Ribes acerifolium	
First	Cutover (Prior 1940)	8,364	558,257	817,010	45,004			1,420,271
	Burn (Prior 1940)	1,132	153,516	790,402	3,956			947,874
	Reproduction	163,752	9,339,940	21,951,900	224,401	2,947		31,519,188
	Pole	121,779	2,883,306	2,899,348	208,435	21,714	3,914	6,016,717
	Mature	141,657	4,003,180	1,614,111	154,461		2,027	5,773,779
	Brush	3,599	68,387	203,158	64,562			336,107
	Subalpine	1,933	116,392	40,111	19			156,522
	Meadow-Field	71						
	All Upland	442,287	17,122,978	28,316,040	700,838	24,661	5,941	46,170,458
	Stream	22,210	4,859,149	425,512	3,854,943		19,584	9,159,187
Second	All Types	464,497	21,982,126	28,741,552	4,555,781	24,661	25,525	55,329,645
	Cutover (Prior 1940)	4,614	525,875	1,213,372	10,403			1,749,650
	Reproduction	33,748	1,352,725	3,372,686	29,528			4,754,939
	Pole	16,456	295,131	296,853	11,143			603,127
	Mature	5,463	168,973	160,587	3,874			333,434
	Brush	688	16,170	11,341	875			28,386
	Subalpine	110	8,585	4,022				12,607
	Meadow-Field	10	72					72
	All Upland	61,089	2,367,531	5,058,861	55,823			7,482,215
	Stream	5,198	504,471	50,656	404,427			959,554
Third	All Types	66,287	2,872,002	5,109,517	460,250			8,441,769
	Cutover (Prior 1940)	140	5,481	3,688	5,001			14,170
	Reproduction	6,638	216,298	582,185	2,408			800,891
	Pole	475	6,278	13,526	125			19,929
	Mature	105	713	671				1,384
	Brush	179	1,109	1,893	24			3,026
	All Upland	7,537	229,879	601,963	7,558			839,400
	Stream	523	28,914	4,045	1,873			34,832
	All Types	8,060	258,793	606,008	9,431			874,232
	Cutover (Prior 1940)	13,118	1,089,613	2,034,070	60,408			3,184,091
All Workings	Burn (Prior 1940)	1,132	153,516	790,402	3,956			947,874
	Reproduction	204,138	10,908,963	25,906,771	256,337	2,947		37,075,018
	Pole	138,710	3,184,715	3,209,727	219,703	21,714	3,914	6,639,773
	Mature	147,225	4,172,866	1,775,369	153,335		2,027	6,108,597
	Brush	4,466	85,666	216,392	65,461			367,519
	Subalpine	2,043	124,977	44,133	19			169,129
	Meadow-Field	81	72					72
	All Upland	510,913	19,720,368	33,976,864	764,219	24,661	5,941	54,492,073
	Stream	27,931	5,392,533	480,213	4,261,243		19,584	10,153,573
	All Types	538,844	25,112,921	34,457,077	5,025,462	24,661	25,525	64,645,646





BLISTER RUST CONTROL WORK, MONTANA OPERATION, 1942

By

A. S. Skoglund, Assistant Pathologist

INTRODUCTION

Blister rust control activities on the Montana operation were restricted to the Cabinet National Forest to alleviate the transportation situation and to simplify the supervision of the project.

The loss of CCC and WPA crews along with the difficulties in securing labor for the regular camps and adverse weather in May and June greatly reduced the size of the field program and the accomplishments as compared with the 1941 season. A total of 2,540 acres was worked in 1942, which brings the total progress for the Montana operation (Cabinet and Kootenai Forests) to 125,739 acres worked initially and 12,528 acres reworked. Ribes eradication has been deferred on 19,958 acres, and 55,043 acres need initial ribes eradication.

ORGANIZATION AND ADMINISTRATION

The Forest Service was responsible for the administration and maintenance of the camps, and technical supervision was provided by the Bureau of Entomology and Plant Quarantine. The field organization was as follows:

C. H. Johnson, Forest Officer in Charge, U. S. Forest Service	
A. S. Skoglund, Technical Supervisor, Bureau of Entomology and Plant Quarantine	
Forest Service Regular Camps	3
Number of Checkers	2
Number of Employees on Project	131

The first camp was established on April 28, and all were established by June 1. Two of the camps were moved to new locations during the summer, and all of them were discontinued during the month of September. Incessant rains during June retarded work and contributed to an abnormally high turnover of labor. One compensating factor was the relatively light fire conditions during July and August, which did not disrupt blister rust control work.

Regular checking was performed on 1,503 acres in 1942, at an average cost of \$0.18 $\frac{1}{2}$ per acre.

LOCATION AND DESCRIPTION OF AREAS

Work was confined to the heavier working types in the Trout Creek and St. Regis River drainages.

The work in the Trout Creek area was a continuation of that started in 1941. Very heavy ribes conditions were encountered in this excellent reproduction type on burned-over land. As this area was not completed this season, it should receive high priority in 1943.

In Savenac Nursery an intensive check was made of the transplant and seedling stock in the spring of 1942. Eighty-three infected specimens were found in a check of 40,500 samples of 2-2 transplant stock sown in the fall of 1937 and transplanted in the spring of 1940. This represents .205 per cent infection. A survey of 32,000 specimens of two-year-old seedling stock sown in the fall of 1939 and germinated in the spring of 1940, disclosed 143 infected ones or .447 per cent infection. The pattern obtained by this survey revealed the infection to be of random distribution and possibly of long distance spread from the heavy masses of Ribes viscosissimum under Haugan Lookout. These ribes were removed in 1941 and 1942. The stream type in the Savenac Nursery protection zone was checked, and the scattered ribes removed.

The plantation areas in the West Fork of Big Creek were surveyed and the scattered concentrations of ribes removed. The stream type along the main creek was also worked. These ribes germinated for the most part from seed washed down the creek during the flood stages. This excellent stand of white pine reproduction has a scattering of infection. The reproduction in Gilt Edge Creek is infected very slightly and only near the stream. The reproduction in the main creek and four chains up the north-facing slope is 22 per cent infected, but the infection diminishes very rapidly beyond four chains. Ribes eradication performed in 1942 should prevent a further build-up of rust damage. A small amount of pruning of white pine has been done, and further pruning work in this area is recommended.

Rework was performed on the plantation areas of Rainy Creek. The conditions in Rainy Creek were reported in the 1941 annual report. In this area the white pine seed continue to germinate, and undoubtedly many of the diseased trees will be replaced by new seedlings.

First working and rework were done on the Sildex Plantation site. A small amount of Atlacide spraying was applied to R. triste in the main river. This area of pole size white pine contains about five per cent infection, although most cankers are near the ends of the rather long branches. The present infection does not appear to be damaging. Initial work took place in 1934 on about two thirds of the area. While the results of the ribes eradication work in 1942 on this area were not as efficient as expected, the necessity for any further control work will be determined by future surveys of the area.

CONTROL STATUS

In the Cabinet National Forest 74,421 acres have been initially worked. Of this area 38,345 acres have been placed on a maintenance basis, and 10,800 acres are on post check, leaving 25,076 acres on rework. There are also 23,380 acres to be initially worked.

The blister rust control area in the Cabinet National Forest may be divided into three parts on the basis of working and infection conditions, namely: St. Regis River, Clark Fork River and Bull River units. The St. Regis River unit, which includes Rainy and Big Creeks as well as Savenac Nursery, contains for the most part reproduction and planted stands on 1910 burned-over lands supporting heavy concentrations of ribes. Pine infection is relatively heavy and is of 1931 and 1934 origins with considerable build-up in 1937 to

1940. The masses of stream type ribes have been removed and Savenac Nursery and the West Fork of Big Creek are now in a satisfactory condition. About one half of the worked area in the East and Middle Forks of Big Creek will require some additional work.

The Clark Fork unit comprising seven drainages is predominantly reproduction and pole size white pine. Stream type conditions were relatively light which accounts for the small amount of infection. Trout Creek and Marten Creek have first working to be completed in 1943. Considerable acreage of pole size timber remains to be worked in this unit, but will be deferred until after more urgent needs are met in the Kootenai Forest.

The Bull River unit is composed of all types of stands associated with R. inermis stream type conditions. The infection is localized near streams which need to be reworked. Snake Creek has an area to be initially worked in the near future.

In the Kootenai National Forest 51,318 acres have been worked of which 28,163 acres are on maintenance, 13,663 acres are on post check, and 9,392 acres are to be reworked. There remain 31,663 acres to be initially worked in addition to 16,924 acres deferred.

The blister rust control area in the Kootenai National Forest may also be divided into three parts, namely: Yaak River, Libby, and Troy units. The Yaak River unit is predominantly pole and mature types with light ribes conditions. With very little infection having been found, it is planned to do no more work until the mature stands are logged. The amount of work required in the pole stands on Red Top and Cyclone Creeks will be determined by future disease surveys.

The Libby unit contains 70 per cent pole and mature types and 30 per cent reproduction. The ribes conditions are very light in the pole and mature stands and medium in the reproduction stands. Infection of 1937 and 1940 origin has been found in the reproduction stands in the southern end of the unit. Initial work should be started in this unit in the near future.

The Troy unit contains 52,039 acres of which 23,096 have been worked. The greatest amount of infection in the forest was found in this unit with the first being located in 1935. A very heavy center is located in Ross Creek just south of the lake. A small amount of infection of 1940 origin was found at Spar Lake. The area immediately west and north of Spar Lake should be worked in 1943. Extensive logging has been done in this unit in the last two years, consequently much of the area needs to be re-examined to determine limits and amounts of area to be classified as white pine.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs by cooperative agency and type of appropriation is shown in the following tabulations:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1942
MONTANA OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 3,081.47
Forest Service	Regular BLR-4	39,740.29
Total		\$42,821.76

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1942
MONTANA OPERATION

Item	Bureau of Entomology and Plant Quarantine	Forest Service	Total
	Regular BLR-1-4	Regular BLR-4	
Sal., perm. men	\$2,824.80	\$ 3,195.72	\$ 6,020.52
Sal., temp. men		2,528.99	2,528.99
Wages, temp. labs.		25,996.56	25,996.56
Subs. supplies		6,369.11	6,369.11
Equipment		1,018.90	1,018.90
Travel and transp.	228.86	418.55	647.41
Other supplies	27.81	212.46	240.27
Total	\$3,081.47	\$39,740.29	\$42,821.76

TABLE 2A

DISTRIBUTION OF EXPENDITURES BY PROJECTS, 1942
MONTANA OPERATION

Project	Expenditures	Number Effective Man-Days	Effective Man-Day Cost
Planning, Coordination and Technical Direction BEPQ Regular BLR-1-4	\$ 3,081.47		
National Forest Lands Forest Service Regular BLR-4	\$39,740.29	3,755	\$10.58

Forest Service

Number meals served	23,133
Average cost per meal	\$0.275
Pounds of twine	650
Pounds of chemical	600

SUMMARY OF RIBES ERADICATION, 1942
MONTANA OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Forest	Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray	Ribes Remaining Per Acre	
									Bushes	Live Stem
Cabinet	Reproduction	368	644	309	1,321	1,940	218,345		14.0	42.1
	Pole	52	192		244	592	100,873		16.6	41.0
	All Upland	420	836	309	1,565	2,532	319,218		14.7	41.9
	Stream (Hand)		83	279	362	459	46,749			
	Stream (Chemical)		5		5	10	1,800	600		
	All Stream		83	279	362	469	48,549		5.9	15.3
Savenac Nursery	All Typee	420	919	588	1,927	3,001	367,767		14.4	40.9
	Reproduction	92	15	60	167	682	158,777		17.1	27.2
	Stream (Hand)		22	424	446	72	5,595		1.0	1.2
	All Types	92	37	484	613	754	164,372		10.0	15.8
All Forests	Reproduction	460	659	369	1,488	2,622	377,122		14.7	39.0
	Pole	52	192		244	592	100,873		16.6	41.0
	All Upland	512	851	369	1,732	3,214	477,995		15.1	39.4
	Stream (Hand)		105	703	808	531	52,344			
	Stream (Chemical)		5		5	10	1,800			
	All Stream		105	703	808	541	54,144		2.0	3.9
	All Types	512	956	1,072	2,540	3,755	532,139		13.3	34.6

TABLE 3A - FIRST WORKING

Forest	Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
						Man- Days	Ribes	Gallons Spray	Bushes	Live Stem
Cabinet	Reproduction	368	1,061	131,173		2.88	356		54.0	164.0
	Pole	52	236	47,400		4.54	912		42.1	101.8
	All Typee	420	1,297	178,573		3.09	425		50.0	143.0
Savenac Nursery	Reproduction	92	642	155,640		6.98	1,692		22.7	34.3
All Forests	Reproduction	460	1,703	286,813		3.70	624		37.5	95.8
	Pole	52	236	47,400		4.54	912		42.1	101.8
	All Types	512	1,939	334,213		3.79	653		38.8	98.1

TABLE 3B - SECOND WORKING

Cabinet	Reproduction	644	580	68,430		.90	106		8.0	24.6
	Pole	192	356	53,473		1.85	279		10.1	25.3
	All Upland	836	936	121,903		1.12	146		8.5	24.8
	Stream (Hand)	83	173	14,102		2.08	170			
	Stream (Chemical)	5	10	1,800	600	2.00	360	120		
	All Stream	83	183	15,902		2.20	192		5.9	15.3
	All Typee	919	1,119	137,805		1.22	150		8.4	24.4
Savenac Nursery	Reproduction	15	5	137		.33	9		0	0
	Stream	22	9	353		.41	16			
	All Types	37	14	490		.38	13		0	0
All Forests	Reproduction	659	585	68,567		.89	104		7.9	24.1
	Pole	192	356	53,473		1.85	279		10.1	25.3
	All Upland	851	941	122,040		1.11	143		8.4	24.4
	Stream (Hand)	105	182	14,455		1.73	138			
	Stream (Chemical)	5	10	1,800	600	2.00	360	120		
	All Stream	105	192	16,255		1.83	155		5.9	15.3
	All Typee	956	1,133	138,295		1.19	145		8.3	24.0

TABLE 3C - THIRD WORKING

Cabinet	Reproduction	309	299	18,742		.97	61		6.5	14.0
	Stream (Hand)	279	286	32,647		1.03	117			
	All Typee	588	585	51,389		.99	87		6.5	14.0
Savenac Nursery	Reproduction	60	35	3,000		.58	50		11.1	20.5
	Stream (Hand)	424	63	5,242		.15	12		1.0	1.2
	All Types	484	98	8,242		.20	17		4.2	7.4
All Forests	Reproduction	369	334	21,742		.91	59		8.5	16.8
	Stream (Hand)	703	319	37,889		.50	54		1.0	1.2
	All Typee	1,072	683	59,631		.64	56		4.9	9.4



TABLE 4

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1942
MONTANA OPERATION

Forest	Working	Number of Acres Worked by Forest Service		
		National Forest	Private	Total
Cabinet	First	420		420
	Second	846	73	919
	Third	475	113	588
	Total	1,741	186	1,927
Savaneac Nursery	First	92		92
	Second	34	3	37
	Third	181	303	484
	Total	307	306	613
All Forests	First	512		512
	Second	880	76	956
	Third	656	416	1,072
	Total	2,048	492	2,540

TABLE 5

TOTAL RIBES BY SPECIES ERADICATED, 1942
MONTANA OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes lacustris	Ribes viscosissimum	Ribes petiolare	Ribes inarme	Ribes triste	
First	Reproduction	460	54,179	232,634				286,813
	Pole	52	47,400					47,400
	All Types	512	101,579	232,634				334,213
Second	Reproduction	659	61,717	6,850				68,567
	Pole	192	53,354		119			53,473
	All Upland	851	115,071	6,850	119			122,040
	Stream	105	8,342	163	5,490		1,270	16,255
	All Types	956	123,413	7,013	6,599		1,270	139,295
Third	Reproduction	369	15,092	6,443	93		114	21,742
	Stream	703	9,965	319	18,391	622	8,652	37,989
	All Types	1,072	25,057	6,762	18,424	622	8,766	59,631
All Workings	Reproduction	1,488	130,988	245,927	93		114	377,122
	Pole	244	100,754		119			100,873
	All Upland	1,732	231,742	245,927	212		114	477,995
	Stream	808	18,307	482	24,511	622	9,922	54,144
	All Types	2,540	250,049	246,409	25,023	622	10,036	532,139

SUMMARY OF RIBES ERADICATION, 1928-1942
MONTANA OPERATION

TABLE 5 - SUMMARY OF ALL WORKINGS

Forest	Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Kootenai	Burn (Prior 1940)	115			115	1	32	
	Reproduction	12,504	341		12,845	8,783	1,101,839	
	Pole	16,834	779		19,663	7,830	851,971	
	Mature	16,427			16,427	3,539	481,919	
	Brush	235			235	94	7,956	
	Meadow-Field	103			103	1		
	All Upland	48,268	1,120		49,388	20,248	2,443,717	
	Stream (Hand)	3,050	533		3,583	8,982	1,277,034	
	All Types	51,318	1,653		52,971	29,230	3,720,751	
	Reproduction	27,758	4,670	703	33,131	33,526	6,048,216	
Cabinet	Pole	23,634	783	50	24,467	9,997	1,837,428	
	Mature	9,297	12		9,309	4,462	1,065,784	
	Brush	3,481			3,481	2,044	583,683	
	Meadow-Field	348			348	150	12,131	
	All Upland	64,518	5,465	753	70,736	50,179	9,547,242	
	Stream (Hand)	3,717	1,003	351	5,071	12,639	3,017,509	
	Stream (Chemical)	465	116	12	593	1,604	108,762	36,254
	Stream (Mechanical)	98			98	859	51,000	
	All Stream	3,815	1,003	351	5,169	15,352	3,177,271	
	All Types	68,333	6,468	1,104	75,905	65,541	12,724,513	
Savaneac Nursery	Reproduction	5,000	179	85	5,264	1,944	559,902	
	Stream (Hand)	1,088	984	2,040	4,112	4,249	730,520	
	Stream (Chemical)	239	62		301	880	200,801	36,262
	Stream (Mechanical)	45	15	40	100	846	45,500	
	All Stream	1,088	999	2,040	4,127	5,975	976,821	
	All Types	6,088	1,178	2,125	9,391	7,919	1,536,723	
All Forests	Burn (Prior 1940)	115			115	1	32	
	Reproduction	45,262	5,190	789	51,240	44,253	7,709,957	
	Pole	42,518	1,562	50	44,130	17,827	2,689,399	
	Mature	25,724	12		25,736	8,001	1,547,703	
	Brush	3,716			3,716	2,138	591,639	
	Meadow-Field	451			451	151	12,131	
	All Upland	117,786	6,764	839	125,389	72,371	12,550,861	
	Stream (Hand)	7,855	2,520	2,391	12,766	26,130	5,025,053	
	Stream (Chemical)	704	178	12	894	2,484	309,563	72,516
	Stream (Mechanical)	143	15	40	198	1,705	96,500	
All Forests	All Stream	7,953	2,535	2,391	12,879	30,319	5,431,126	
	All Types	125,739	9,299	3,229	138,267	102,690	17,981,987	

TABLE 6A - FIRST WORKING

Forest	Eradication Type	Acres	Effective Man-Lays	Total Ribes	Gallons Spray	Per Acre Basis	
						Man-Days	Gallons Spray
Kootenai	Burn (Prior 1940)	115	1	32		.01	1
	Reproduction	12,504	8,618	1,076,317		.69	96
	Pole	18,884	7,223	811,481		.32	43
	Mature	16,427	3,539	491,919		.22	29
	Brush	235	94	7,956		.40	34
	Meadow-Field	103	1			.01	
	All Upland	48,268	19,476	2,377,705		.40	49
	Stream (Hand)	3,050	8,177	1,214,159		2.68	398
	All Types	51,318	27,653	3,591,864		.54	70
	Reproduction	27,758	26,677	5,300,251		.96	191
Cabinet	Pole	23,634	9,148	1,742,087		.39	74
	Mature	9,297	4,447	1,064,328		.48	114
	Brush	3,481	2,044	583,633		.59	168
	Meadow-Field	348	150	12,131		.43	35
	All Upland	64,518	42,466	8,702,480		.68	135
	Stream (Hand)	3,717	10,729	2,828,039		2.89	761
	Stream (Chemical)	465	1,180	77,079	25,693	2.54	166
	Stream (Mechanical)	38	859	51,000		8.77	520
	All Stream	3,915	12,768	2,956,118		3.35	775
	All Types	68,333	55,234	11,658,598		.81	171
Sevenac Nursery	Reproduction	5,000	1,688	521,650		.34	104
	Stream (Hand)	1,088	1,710	372,268		1.57	342
	Stream (Chemical)	239	777	188,401	32,132	3.25	788
	Stream (Mechanical)	45	168	22,500		3.73	500
	All Stream	1,088	2,655	593,169		2.44	536
	All Types	6,088	4,343	1,104,819		.71	181
All Forests	Burn (Prior 1940)	115	1	32		.01	1
	Reproduction	45,262	36,983	6,898,218		.82	152
	Pole	42,518	16,371	2,553,568		.39	60
	Mature	25,724	7,986	1,546,247		.31	60
	Brush	3,716	2,133	591,639		.58	159
	Meadow-Field	451	151	12,131		.33	27
	All Upland	117,786	63,630	11,601,335		.54	98
	Stream (Hand)	7,355	20,616	4,414,466		2.62	562
	Stream (Chemical)	704	1,957	265,480	57,825	2.78	377
	Stream (Mechanical)	143	1,027	73,500		7.18	514
	All Stream	7,953	23,600	4,753,446		2.37	598
	All Types	125,739	87,230	16,355,281		.69	130

TABLE 6B - SECOND WORKING

Kootenai	Reproduction	341	165	25,522		.48	75
	Pole	779	607	40,490		.78	52
	All Upland	1,120	772	66,012		.69	59
	Stream (Hand)	533	805	62,875		1.51	118
	All Types	1,653	1,577	128,887		.95	78
Cabinet	Reproduction	4,670	6,080	675,094		1.30	145
	Pole	783	750	89,475		.96	114
	Mature	12	15	1,456		1.25	121
	All Upland	5,465	6,845	766,025		1.25	140
	Stream (Hand)	1,003	1,844	181,609		1.84	151
	Stream (Chemical)	116	276	21,048	7,016	2.38	181
	All Stream	1,003	2,120	172,657		2.11	172
	All Types	6,468	8,965	938,682		1.39	145
Sevenac Nursery	Reproduction	179	186	34,173		1.04	191
	Stream (Hand)	984	1,018	294,673		1.03	299
	Stream (Chemical)	62	103	12,400	4,130	1.66	200
	Stream (Mechanical)	15	36	3,000		2.40	200
	All Stream	999	1,157	310,073		1.16	310
	All Types	1,178	1,343	344,246		1.14	292
All Forests	Reproduction	5,190	6,431	734,789		1.24	142
	Pole	1,562	1,357	129,965		.87	83
	Mature	12	15	1,456		1.25	121
	All Upland	6,764	7,803	866,210		1.15	128
	Stream (Hand)	2,520	3,667	509,157		1.46	202
	Stream (Chemical)	178	379	33,448	11,146	2.13	188
	Stream (Mechanical)	15	36	3,000		2.40	200
	All Stream	2,535	4,082	545,605		1.61	215
	All Types	9,299	11,885	1,411,815		1.28	152

TABLE 6C - THIRD WORKING

Cabinet	Reproduction	703	769	72,871		1.09	104
	Pole	50	99	5,866		1.98	117
	All Upland	753	868	78,737		1.15	105
	Stream (Hand)	351	326	37,861		.93	108
	Stream (Chemical)	12	148	10,635	3,545	12.33	886
	All Stream	351	474	48,496		1.35	138
Sevenac Nursery	All Types	1,104	1,342	127,233		1.22	115
	Reproduction	85	70	4,079		.82	48
	Stream (Hand)	2,040	1,521	63,579		.75	31
	Stream (Mechanical)	40	642	20,000		16.05	500
	All Stream	2,040	2,163	83,579		1.06	41
All Forests	All Types	2,125	2,233	87,658		1.05	41
	Reproduction	788	839	76,950		1.06	98
	Pole	50	99	5,866		1.98	117
	All Upland	838	938	82,816		1.12	99
	Stream (Hand)	2,391	1,847	101,440		.77	42
	Stream (Chemical)	12	148	10,635	3,545	12.33	886
	Stream (Mechanical)	40	642	20,000		16.05	500
	All Stream	2,391	2,627	132,075		1.10	55
	All Types	3,229	3,575	214,891		1.11	67



TABLE 7

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1928-1942
MONTANA OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man- Days	Ribes	Gallons Per Sprayed Area
First	EQ-Reg.	1,383	2,315	462,300	30,665	1.67	334	148
	EQ-Emerg.	64,086	28,413	5,450,738	1,330	.44	85	44
	FS-Reg.	13,036	13,331	1,987,742	2,452	1.02	152	54
	FS-Emerg.	33,462	33,088	7,157,633	20,598	.99	214	55
	CCC	13,772	10,083	1,296,868	2,780	.73	94	59
	Total	125,739	87,230	16,355,281	57,825	.69	130	82
Second	EQ-Reg.	619	980	299,410	4,130	1.58	484	67
	EQ-Emerg.	1,342	1,597	265,637		1.19	198	
	FS-Reg.	4,560	4,670	479,320	5,976	1.02	105	62
	FS-Emerg.	2,100	2,464	204,021	1,040	1.17	97	52
	CCC	678	2,174	163,427		3.21	241	
	Total	9,299	11,885	1,411,815	11,146	1.28	152	63
Third	EQ-Emerg.	648	777	59,040		1.20	91	
	FS-Reg.	2,406	2,547	138,068		1.06	57	
	FS-Emerg.	150	68	6,069		.45	40	
	CCC	25	183	11,714	3,545	7.32	469	295
	Total	3,229	3,575	214,891	3,545	1.11	67	295
All Workings	EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380	129
	EQ-Emerg.	66,076	30,787	5,775,415	1,330	.47	87	44
	FS-Reg.	20,002	20,548	2,605,130	8,428	1.03	130	60
	FS-Emerg.	35,712	35,620	7,367,723	21,638	1.00	206	55
	CCC	14,475	12,440	1,472,009	6,325	.86	102	107
	Total	138,267	102,690	17,981,987	72,516	.74	130	81

TABLE 8

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1928-1942
MONTANA OPERATION

Forest	Working	Number of Acres Worked						
		Federal			Other			Total
		National Forest	Public Domain	Total	State	Private	Total	
Kootenai	First	46,781		46,781		4,537	4,537	51,318
	Second	1,165		1,165		488	488	1,653
	Total	47,946		47,946		5,025	5,025	52,971
Cabinet	First	57,485	40	57,525	576	16,320	16,896	74,421
	Second	6,091		6,091		1,555	1,555	7,646
	Third	1,553		1,553		1,676	1,676	3,229
	Total	65,129	40	65,169	576	19,551	20,127	85,296
All Forests	First	104,266	40	104,306	576	20,857	21,433	125,739
	Second	7,256		7,256		2,043	2,043	9,299
	Third	1,553		1,553		1,676	1,676	3,229
	Total	113,075	40	113,115	576	24,576	25,152	138,267



TABLE 9

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1928-1942
MONTANA OPERATION

Forest	Ownership Class	Number of Acres			Acres on Which Working is Deferred	Total Acres White Pine
		Worked	Unworked	Total		
Kootenai	National Forest	46,781	25,680	72,461	14,434	86,895
	State		234	234		234
	Private	4,537	5,749	10,286	2,490	12,776
	Subtotal Other	4,537	5,983	10,520	2,490	13,010
	Total	51,318	31,663	82,981	16,924	99,905
Cabinet	National Forest	57,485	16,469	73,954	3,034	76,988
	Public Domain	40		40		40
	Subtotal Federal	57,525	16,469	73,994	3,034	77,028
	State	576		576		576
	Private	16,320	6,911	23,231		23,231
	Subtotal Other	16,896	6,911	23,807		23,807
	Total	74,421	23,380	97,801	3,034	100,835
All Forests	National Forest	104,266	42,149	146,415	17,468	163,883
	Public Domain	40		40		40
	Subtotal Federal	104,306	42,149	146,455	17,468	163,923
	State	576	234	810		810
	Private	20,857	12,660	33,517	2,490	36,007
	Subtotal Other	21,433	12,894	34,327	2,490	36,817
	Total	125,739	55,043	180,782	19,958	200,740

TABLE 10

TOTAL RIBES BY SPECIES ERADICATED, 1928-1942
MONTANA OPERATION

Working	Eradication Type	Acres	Ribes by Species							Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triste	
First	Burn (Prior 1940)	115	32							32
	Reproduction	45,262	3,149,308	3,569,225	4,714	55,569	114,802	3,455	1,145	6,898,218
	Pole	42,518	1,425,435	942,390	200	101,205	84,338			2,553,568
	Mature	25,724	1,341,526	177,396	259	11,080	8,729	7,257		1,546,247
	Brush	3,716	286,409	294,808		5,260	5,162			591,639
	Meadow-Field	451	5,010			7,121				12,131
	All Upland	117,786	6,207,720	4,983,819	5,173	180,235	213,031	10,712	1,145	11,601,835
	Stream	7,953	3,026,316	118,098	266,006	1,284,254	5,744	31,905	21,123	4,753,446
	All Types	125,739	9,234,036	5,101,917	271,179	1,464,489	218,775	42,617	22,268	16,355,281
Second	Reproduction	5,190	429,241	282,763	4,860	4,668	10,666		2,591	734,789
	Pole	1,562	98,222	24,284	119	6,419	921			129,965
	Mature	12	1,456							1,456
	All Upland	6,764	528,919	307,047	4,979	11,087	11,587		2,591	866,210
	Stream	2,535	151,219	3,286	48,208	324,083	10,975		7,834	545,605
	All Types	9,299	680,138	310,333	53,187	335,170	22,562		10,425	1,411,815
Third	Reproduction	788	45,864	30,679	93		200		114	76,950
	Pole	50	800	5,060			6			5,866
	All Upland	838	46,664	35,739	93		206		114	82,816
	Stream	2,391	17,832	339	35,905	62,257			15,742	132,075
	All Types	3,229	64,496	36,078	35,998	62,257	206		15,856	214,891
All Workings	Burn (Prior 1940)	115	32							32
	Reproduction	51,240	3,624,413	3,882,667	9,667	60,237	125,668	3,455	3,850	7,709,957
	Pole	44,130	1,524,457	971,734	319	107,624	85,265			2,689,399
	Mature	25,736	1,342,982	177,396	259	11,080	8,729	7,257		1,547,703
	Brush	3,716	286,409	294,808		5,260	5,162			591,639
	Meadow-Field	451	5,010			7,121				12,131
	All Upland	125,388	6,783,303	5,326,605	10,245	191,322	224,824	10,712	3,850	12,550,861
	Stream	12,879	3,195,367	121,723	350,119	1,670,594	16,719	31,905	44,699	5,431,126
	All Types	138,267	9,978,670	5,448,328	360,364	1,861,916	241,543	42,617	48,549	17,981,987

WHITE PINE BLISTER RUST CONTROL ON NATIONAL AND STATE PARKS, 1942

By

M. C. Riley
Associate Forester

White pine blister rust control work in National and State Parks was confined to Mount Rainier and Glacier National Parks. No work was done on or adjacent to the Mount Spokane State Park area since there is no appreciable amount of Federal or Timber Protective Association lands and almost constant change of ownership precludes the possibility of any cooperative program at the present time. Progress of ribes eradication to date for this area is shown in the 1941 annual report for the Mount Spokane operation.

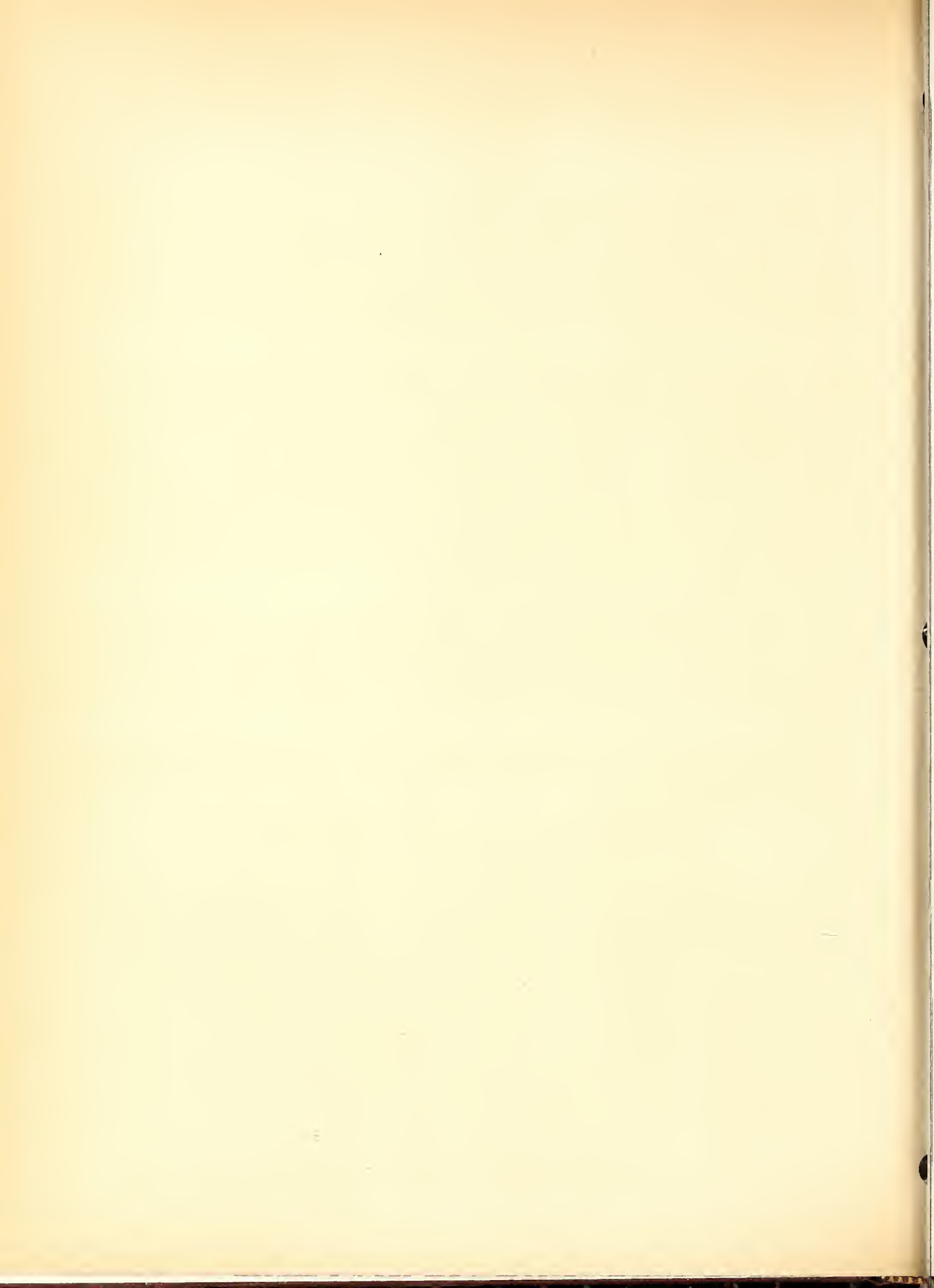
During the course of the season a small amount of time was spent on the Mount Spokane area in performing post check and in examining areas where canker elimination and pruning had been done. The results of canker elimination and pruning appeared to be entirely successful in saving infected trees and preserving adequate stocking of white pine reproduction. While the pruning of trees was held to the lower one third of the crown except where infection occurred in branches above this, the inspection this year indicated that at least one and generally two additional whorls of branches could have been cut off without hurting the young white pine. It was observed that pruning did not cause adventitious budding where limbs were cut off, even in cases where there were many such buds before pruning.

Control status figures for the Mount Spokane operation show that 23,377 acres have been given first working and 11,583 acres are unworked for a total of 34,960 acres in the control area. In the 23,377 acres which have been worked, 10,409 are on a maintenance basis, 4,740 need post check and 8,228 acres need reworking.

A complete report for each National Park is given on the following pages, while a short summary of the ribes eradication work accomplished thus far in each park is given below:

PROGRESS OF RIBES ERADICATION, MOUNT RAINIER AND GLACIER NATIONAL PARKS

National Park	Working	Acres	Effective Man-Days	Total Ribes	Per Acre	
					Man-Days	Ribes
Mount Rainier	First	8,254	10,070	1,640,507	1.22	199
	Second	5,028	5,941	400,913	1.18	80
	Third	3,944	2,909	94,224	.74	24
	Total	17,226	18,920	2,135,644	1.10	124
Glacier	First	2,895	3,134	360,996	1.08	125
	Second	731	763	122,606	1.04	168
	Total	3,626	3,897	483,602	1.07	133
Mount Rainier and Glacier	First	11,149	13,204	2,001,503	1.18	180
	Second	5,759	6,704	523,519	1.16	91
	Third	3,944	2,909	94,224	.74	24
	Total	20,852	22,817	2,619,246	1.09	126



MOUNT RAINIER NATIONAL PARK WASHINGTON

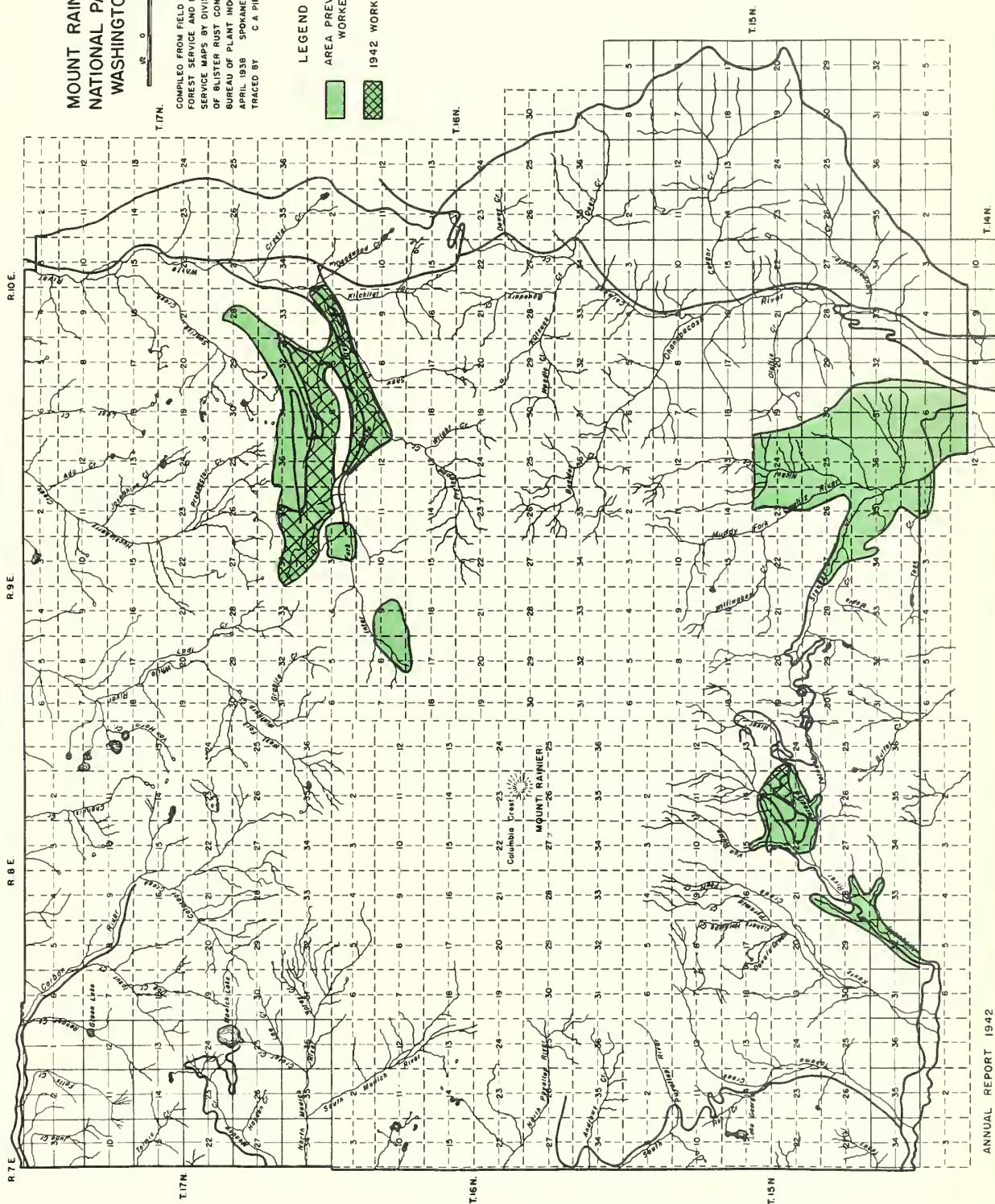
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COMPILED FROM FIELD NOTES
FOREST SERVICE AND PARK
SERVICE MAPS BY DIVISION
OF BLISTER RUST CONTROL
BUREAU OF PLANT INDUSTRY
APRIL 1938 SPOKANE, WASH
TRACED BY C A PIERCE

LEGEND

AREA PREVIOUSLY
WORKED

1942 WORK



BLISTER RUST CONTROL
MOUNT RAINIER NATIONAL PARK, 1942

By
M. C. Riley
Associate Forester

Ribes eradication for the control of white pine blister rust on Mount Rainier National Park during 1942 was a continuation of that started previously on the Silver Forest portion of the Longmire area and on the White River area. In the Silver Forest 71 acres were given second working and 112 acres were worked for the third time. At White River there were 2,021 acres of third working. The work was done by one camp paid from regular funds, which started on the Longmire area on June 11. On July 20 the crew moved to White River and the camp closed on September 5.

Inclement weather with unfavorable working conditions interfered materially with training and the orderly progress of the program while the crew was on the Longmire area so that all contemplated work in the Silver Forest was not completed. The labor problem was acute. Because of higher wages being paid in defense industries in the immediate vicinity it was only possible to secure young inexperienced labor. There was an excessive labor turnover during June and early July because much time was lost due to rain. The work was very capably supervised by an experienced blister rust foreman.

Ribes eradication on the Silver Forest portion of the Longmire area was confined to that part extending east of Canyon rim toward Paradise River and included the main section of the Silver Forest to the northern limits of the control area. At White River the stream type was worked along Yakima Creek and White River as well as practically all of the upland which was not covered during 1941.

After ribes eradication was completed the small crew remaining was assigned to canker elimination east of the Blockhouse in the Sunrise portion of the White River area. This was a continuation of work started during the fall of 1941 but was not entirely completed this season. Much lighter infection conditions were found this year. No trees were so badly infected that their removal was necessary. During the course of this work 315 acres were covered in 93 effective man-days with 7,793 cankers removed from 3,669 infected trees out of a total of 5,824 trees examined.

A representative of the Bureau of Entomology and Plant Quarantine helped plan, organize and supervise the work in addition to checking the areas.

RECOMMENDATIONS

On Mount Rainier National Park a total of 3,254 acres have been given initial working and 8,972 acres have been reworked. Of the total acreage involved in initial working there are approximately 5,500 acres on a maintenance basis. No work has been done on the Starbo area for ten years and none was done in Stevens Canyon during 1942 and no appreciable amount in 1941. Until a decision is made by the National Park Service to continue ribes eradication or to abandon these two areas, they will not be included in the future plans.

Considering only the Longmire and White River areas, initial work has been done on the entire control area of 3,581 acres. A total of 5,761 acres have been covered on rework including second and third workings with an estimated 1,431 acres requiring additional rework. In the control area in the Longmire and White River units there are approximately 2,150 acres on a maintenance basis. In addition to the regular ribes eradication program a project of canker elimination has been conducted on 1,091 acres. There still remain approximately 625 acres on which this work should be done on initial coverage and the total of 1,716 acres should be covered at least once more to save valuable trees.

For the 1943 season the minimum requirement would be a crew of at least 20 men, the actual number depending upon when work could be started. A majority of the time should be spent on the Longmire area doing rework which was not completed during the 1942 season in the Silver Forest area as well as needed rework on the Nisqually River above Longmire and on Paradise Creek. Some canker elimination should be done in the Silver Forest to prevent the unsightly appearance of dead branches. On the White River area a small amount of rework should be done at the public camp ground on the river and in some places rework should be done on areas worked late in the season of 1941. The canker elimination work here should be completed.

RESULTS

The following tables show statements of expenditures, results of the field work for 1942 and accumulative results for all work done to date.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1942 MOUNT RAINIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$1,216.46
National Park Service	Regular BLR-5	8,328.73
Total		\$9,545.19

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1942
MOUNT RAINIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine	National Park Service	Total
	Regular BLR-1-4	Regular BLR-5	
Sal. perm. men	\$ 999.94		\$ 999.94
Personal Services		\$7,976.34	7,976.34
Transportation	211.08	9.80	220.88
Contractual Services		21.29	21.29
Supplies and material		38.99	38.99
Equipment	5.44	282.31	287.75
Total	\$1,216.46	\$8,328.73	\$9,545.19

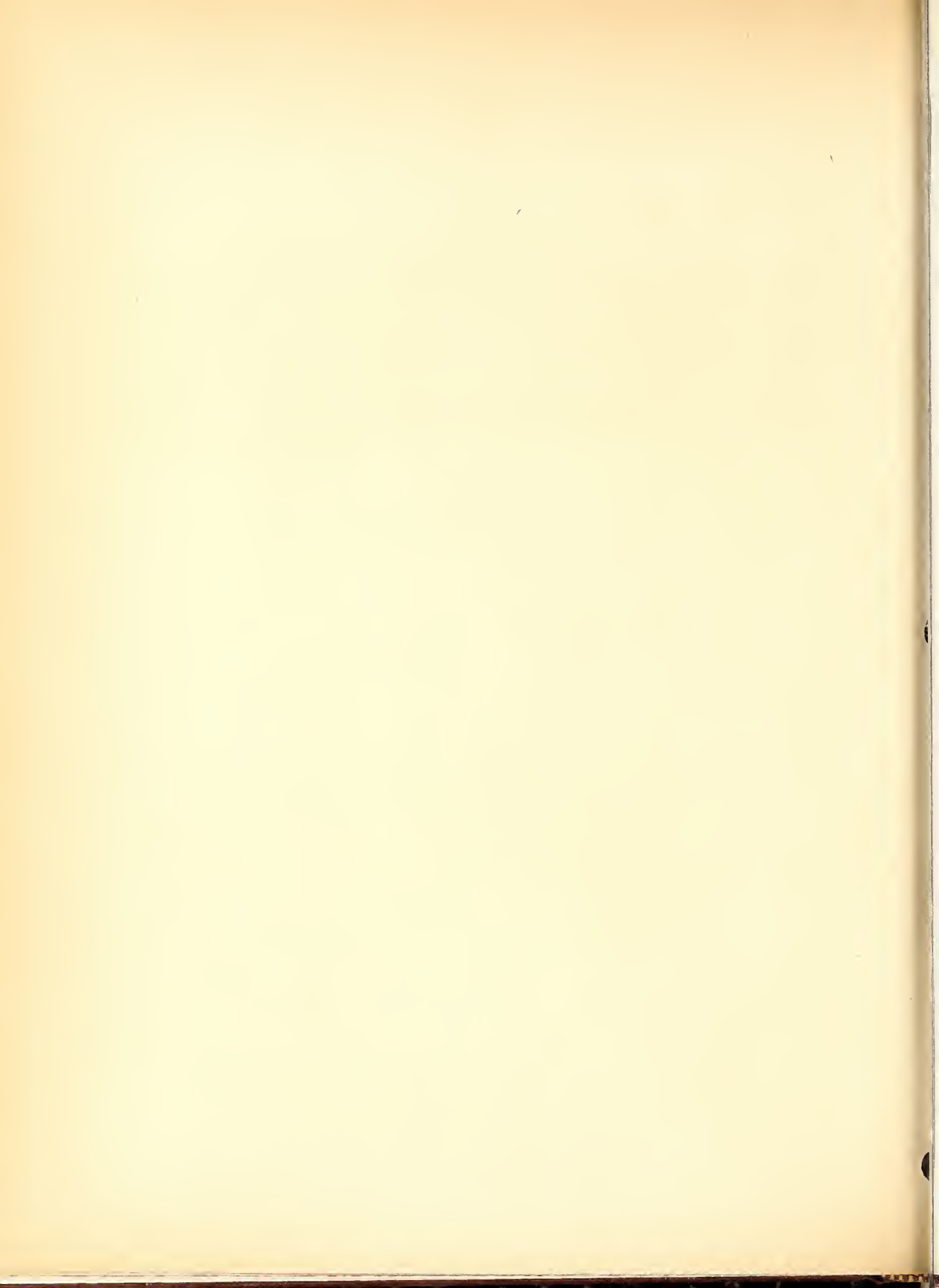


TABLE 3

SUMMARY OF RIBES ERADICATION, 1942
MOUNT RAINIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Men-Days	Ribes by Species						Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes viscosissimum	Ribes bracteosum	Ribes watsonianum	Ribes lexiflorum	Ribes acerifolium		Mn-Days	Ribes
Longmire	Second	Reproduction	71	174	1,217		35			1,462	2,714	2.45	38
	Third	Reproduction	112	299	1,042		456		51	1,425	2,974	2.67	27
	All Workings	Reproduction	183	473	2,259		491		51	2,897	5,688	2.58	31
White River	Third	Pole	1,644	570	524	640		241		4,326	5,731	.35	3
		Stream	377	128	2,159	15	193			4	2,371	.34	6
		All Types	2,021	698	2,683	655	193	241		4,330	8,102	.35	4
All Areas	Second	Reproduction	71	174	1,217		35			1,462	2,714	2.45	38
	Third	Reproduction	112	299	1,042		456		51	1,425	2,974	2.67	27
		Pole	1,644	570	524	640		241		4,326	5,731	.35	3
		All Upland	1,756	569	1,566	640	456	241	51	5,751	8,705	.49	5
		Stream	377	128	2,159	15	193			4	2,371	.34	6
		All Types	2,133	997	3,725	655	649	241	51	5,755	11,076	.47	5
	All Workings	Reproduction	183	473	2,259		491		51	2,897	5,688	2.58	31
		Pole	1,644	570	524	640		241		4,326	5,731	.35	3
		All Upland	1,827	1,043	2,783	640	491	241	51	7,225	11,419	.57	6
		Stream	377	128	2,159	15	193			4	2,371	.34	6
All Types		2,204	1,171	4,942	655	684	241	51	7,217	13,790	.53	6	

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1930-1942
MOUNT RAINIER NATIONAL PARK

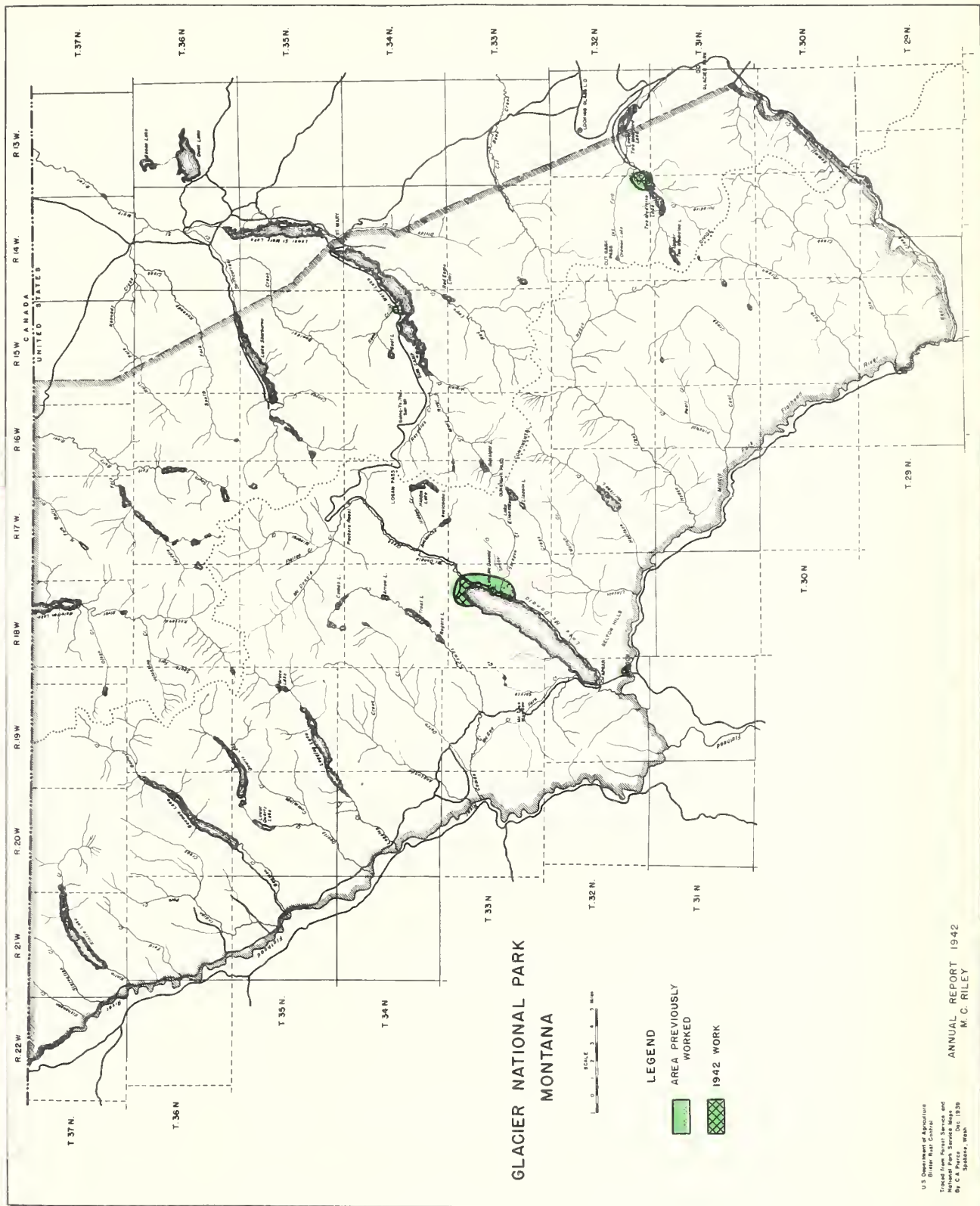
Working	Class	Acres	Effective Men-Days	Total Ribes	Per Acre Basis	
					Men-Days	Ribes
First	NP-Reg.	2,647	3,806	780,171	1.44	295
	NP-CCC	5,607	6,264	860,336	1.12	153
	Total	8,254	10,070	1,640,507	1.22	199
Second	NP-Reg.	766	569	19,395	.74	25
	NP-CCC	4,262	5,372	381,518	1.26	90
	Total	5,028	5,941	400,913	1.18	80
Third	NP-Reg.	2,853	1,853	42,911	.65	15
	NP-CCC	1,091	1,056	51,313	.97	47
	Total	3,944	2,909	94,224	.74	24
All Workings	NP-Reg.	6,266	6,228	842,477	.99	134
	NP-CCC	10,960	12,692	1,293,167	1.16	118
	Total	17,226	18,920	2,135,644	1.10	124



TABLE 5
SUMMARY OF RIBES ERADICATION, 1930-1942
MOUNT RAINIER NATIONAL PARK

Working	Area	Eradication Type	Acres	Effective Man-Days	Ribes by Species								Total Ribes	Per Acre Basis		
					Ribes leucostriatum	Ribes viscosissimum	Ribes bracteatum	Ribes watsenianum	Ribes laxiflorum	Ribes acerifolium	Ribes sanguineum	Ribes triste				
First	Longmire	Reproduction	274	397	40,281		1,101		5,409	5,804			52,595	1.45	192	
		Stream	626	1,202	185,687		97,774		53,899	2,838	16		340,214	1.92	543	
		All Types	900	1,599	225,968		98,875		59,308	8,642	16		392,809	1.78	435	
	Stevens Canyon	Reproduction	2,351	218	28,071		15,986				7,915		51,972	.09	22	
		Pole	704	38	176		1,052				16		1,244	.05	2	
		All Upland	3,055	256	28,247		17,038				7,931		53,216	.08	17	
	White River	Stream	1,132	4,741	72,360	2,055	440,386		914	11	3,959		519,685	3.98	435	
		All Types	4,247	4,997	100,607	2,055	457,424		914	11	11,890		672,901	1.18	135	
		Reproduction	66	50	6,869	239	21	1,133	550	194			9,006	.76	136	
	Starbo	Pole	1,870	2,087	173,780	69,529	539	139,238	1,189	10,801	91	744	395,911	1.12	212	
		Mature	322	264	27,327	12,847			5	45			40,224	.82	125	
		All Upland	2,258	2,401	207,976	82,615	560	140,371	1,744	11,004	91	744	445,141	1.06	197	
	All Areas	Stream	423	744	162,856	1,510	4,869	242	8,820	188	98	8	178,591	1.76	422	
		All Types	2,681	3,145	370,832	84,125	5,429	140,613	10,564	11,228	189	752	623,732	1.17	233	
		Reproduction	48	21	68	7		7		2,305			2,387	.44	50	
	Stevens Canyon	Pole	332	262	11,276	6,131		6,723	3,221	16,658			44,009	.79	133	
		All Upland	380	283	11,344	6,138		6,730	3,221	18,963			46,396	.74	122	
		Stream	46	46	2,663	575		476	546	409			4,669	1.00	102	
	All Areas	All Types	426	329	14,007	6,713		7,206	3,767	19,372			51,065	.77	120	
		Reproduction	2,739	686	75,289	246	17,108	1,140	5,959	8,303	7,915		115,960	.25	42	
		Pole	2,906	2,387	185,232	75,560	1,591	145,961	4,410	27,459	107	744	441,164	.82	152	
	Second	Longmire	Mature	322	264	27,327	12,847			5	45			40,224	.82	125
			All Upland	5,967	3,337	287,648	98,753	18,699	147,101	10,374	35,807	8,022	744	597,348	.56	100
			Stream	2,287	6,763	423,566	4,140	543,059	718	64,179	3,446	4,073	8	1,043,159	2.94	456
Stevens Canyon		All Types	8,254	10,070	711,414	92,893	561,728	147,819	74,553	39,253	12,095	752	1,640,507	1.22	199	
		Reproduction	274	271	10,961		1,126			1,462			13,559	.99	49	
		Stream	614	526	19,977		23,126		2,394	1,426	50		47,043	.86	77	
White River		All Types	888	797	30,938		24,332		2,394	2,888	50		60,602	.90	68	
		Stream	787	2,532	49,131	95	171,224				607		221,057	3.22	231	
		Reproduction	66	12	221			77					296	.15	5	
All Areas		Pole	2,154	1,768	36,284	14,304	2,176	6,864	16,224	4,537			60,389	.81	37	
		Mature	322	47	1,278	2,011							3,289	.15	10	
		All Upland	2,582	1,827	37,783	16,315	2,176	6,941	16,224	4,537			83,976	.11	33	
Longmire		Stream	394	557	32,748		154		5				32,907	1.67	84	
		All Types	2,976	2,484	70,531	16,315	2,330	6,941	16,229	4,537			116,883	.83	39	
		Reproduction	340	283	11,182		1,136			1,462			13,857	.83	41	
Stevens Canyon		Pole	2,194	1,768	36,284	14,304	2,176	6,864	16,224	4,537			80,389	.81	37	
		Mature	322	47	1,278	2,011							3,289	.15	10	
		All Upland	2,856	2,098	48,744	16,315	3,312	6,941	16,224	5,999			97,535	.73	34	
White River		Stream	1,755	3,715	101,856	95	194,574		2,399	1,426	657		301,007	2.07	168	
		All Types	4,651	5,813	150,600	16,410	197,886	6,941	18,623	7,425	657		398,542	1.25	86	
		Reproduction	154	396	8,861		701		66	1,682			11,310	2.58	73	
Stevens Canyon		Stream	489	472	15,619		6,562		316	46	6		22,549	.97	46	
		All Types	643	870	24,480		7,263		382	1,728	6		33,859	1.35	53	
		Stream	220	551	712		23,384						24,096	2.50	110	
Longmire	Pole	2,603	1,209	1,394	3,196		10,515	20	4,883			19,998	.46	8		
	Mature	855	407	15,440	2,258			703	4			18,642	.48	22		
	All Upland	3,458	1,616	16,824	5,464		227	10,515	723			38,640	.47	11		
Stevens Canyon	Reproduction	154	398	8,861		701		66	1,682			11,310	2.58	73		
	Pole	2,603	1,209	1,394	3,196		10,515	20	4,883			19,998	.46	8		
	All Upland	2,757	1,607	10,245	3,196		701	10,515	86			31,308	.58	11		
Longmire	Stream	1,564	1,430	31,771	2,268		30,173	1,019	50	6		65,287	.91	42		
	All Types	4,321	3,037	42,016	5,464	30,874	10,515	1,105	6,615	6		96,595	.70	22		
	Reproduction	702	1,066	60,103		2,938		5,475	8,948			77,464	1.52	110		
Stevens Canyon	Stream	1,729	2,200	221,283		127,532		56,509	4,310	72		409,806	1.27	237		
	All Types	2,431	3,266	281,386		130,470		62,084	13,258	72		487,270	1.34	200		
	Reproduction	2,351	218	28,071		15,986				7,915		51,972	.09	22		
All Areas	Pole	704	38	176		1,052				16		1,244	.05	2		
	All Upland	3,055	256	28,247		17,038				7,931		53,216	.08	17		
	Stream	2,199	7,824	122,203	2,150	634,394		914	11	4,566		764,838	3.56	348		
All Workings	Stevens Canyon	All Types	5,254	8,080	150,450	2,150	652,032		914	11	12,497		818,054	1.54	156	
		Reproduction	132	62	7,090	239	21	1,210	550	194			9,304	.47	70	
		Pole	6,667	5,064	211,448	87,029	2,715	156,617	17,433	20,221	91	744	496,298	.76	74	
	White River	Mature	644	311	28,605	14,858			5	45			43,513	.48	68	
		All Upland	7,443	5,437	247,143	102,126	2,736	157,827	17,988	20,460	91	744	549,115	.73	74	
		Stream	1,672	1,808	211,044	3,778	5,250	242	9,528	192	98	8	230,140	1.08	138	
	Starbo	All Types	9,115	7,245	458,187	105,904	7,986	158,069	27,516	20,652	189	752	779,255	.79	85	
		Reproduction	48	21	68		7			2,305			2,387	.44	50	
		Pole	332	262	11,276	6,131		6,723	3,221	16,658			44,009	.79	133	
	All Areas	All Upland	380	283	11,344	6,138		6,730	3,221	18,963			46,396	.74	122	
		Stream	46	46	2,663	575		476	546	409			4,669	1.00	102	
		All Types	426	329	14,007	6,713		7,206	3,767	19,372			51,065	.77	120	
	Longmire	Reproduction	3,233	1,367	95,332	246	18,945	1,217	6,025	11,447	7,915		141,127	.42	44	
		Pole	7,703	5,364	222,900	93,160	3,767	163,340	20,654	36,879	107	744	541,551	.70	70	
		Mature	644	311	28,605	14,858			5	45			43,513	.48	68	
	All Areas	All Upland	11,580	7,042	346,837	108,264	22,712	164,557	26,684	48,371	8,022	744	726,191	.61	63	
		Stream	5,646	11,878	557,193	6,503	767,776	718	67,597	4,922	4,736	8	1,409,453	2.10	250	
		All Types	17,226	18,920	904,030	114,767	790,488	165,275	94,281	53,293	12,758	752	2,135,644	1.10	124	





U.S. Department of Agriculture
Forest Service
Forest Ranger District
Missoula, Montana
By C. A. Pierce
Spokane, Wash.

ANNUAL REPORT 1942
M. C. RILEY

BLISTER RUST CONTROL, GLACIER NATIONAL PARK, 1942

By

M. C. Riley

Associate Forester

Ribes eradication for the control of white pine blister rust on Glacier National Park during 1942 was a continuation of work started previously on the Park Headquarters, Lake McDonald and Two Medicine areas. At Park Headquarters 300 acres of second working were done, at Lake McDonald there were 10 acres of initial and 293 acres of second working and at Two Medicine 252 acres were given first coverage and 138 acres were worked for the second time. All work was done by one camp paid from regular funds, a transfer of money from Mount Rainier National Park making it possible to start before the 1943 appropriation was available. Ribes eradication started on June 9 on the Lake McDonald area, the crew moved to the east side of the Park on July 24 and the camp closed on September 4.

Inclement weather hindered progress during the training period and for a short time thereafter, but it was possible to complete practically all of the work contemplated. There was no experienced labor available for the job. It was only possible to obtain young, inexperienced workers and there was considerable labor turnover, especially during the early part of the season, due to much time being lost because of rain. It was impossible to secure an experienced blister rust foreman to supervise the work, but the man selected proved satisfactory.

At Park Headquarters the necessary second working was completed. With the exception of two small areas where ribes seedlings are occurring no further work should be needed here for about three years. On the Lake McDonald area a small amount of initial work was done to complete that phase of the program, and all second working was done that should be necessary for at least two years. On the Two Medicine area all initial work was completed as well as most of the urgent second working. Here a definite seedling problem has developed on some of the stream type as is evidenced by more ribes being removed during second working than in first working, and this may mean that more frequent covering of portions of the area will be necessary than had originally been contemplated.

A representative of the Bureau of Entomology and Plant Quarantine helped plan, organize and supervise the work in addition to performing a check on the worked areas. Considerable time was also spent by the Bureau representative in scouting all areas where ribes eradication has been initiated as well as some other white pine areas. No new white pine infections were located although a few more isolated cankers were found on the Lake McDonald area where pine infection was first found in 1941. No ribes infection was found except on one Ribes setosum bush at Park Headquarters. This specimen was tentatively identified as blister rust by the Bureau of Plant Industry, U. S. Department of Agriculture.

RECOMMENDATIONS

This was the first year that regular funds had been used at Glacier National Park, and initial working was completed on the Lake McDonald and Two Medicine areas while second working was done on all three areas. Of the total of 3,194 acres where work has been started, 2,895 acres have been given initial working and 731 acres have been reworked. There are 2,280 acres on a maintenance basis, and there remain 299 acres to be worked for the first time and approximately 615 acres needing rework.

For the 1943 field season a 35-man camp should be employed for those areas where work has already been started. This would assure the completion of urgent rework at Two Medicine as well as the finishing of the initial work started at East Glacier in 1939.

If ribes eradication is started on the Oldman Lake area a 30-man camp will be required since the season would be comparatively short there. It is understood that there is a possibility of using men from a Civilian Public Service camp to do work on the Fern Creek area. Depending upon the availability of men and the date work starts, it is estimated that a 20- to 25-man crew should be used there.

RESULTS

The following tables show the statements of expenditures, results of the field work for 1942 and accumulative results for all work done to date.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1942 GLACIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 1,559.68
National Park Service	Regular BLR-5	8,755.42
Total		\$10,315.10

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1942
GLACIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine	National Park Service	Total
	Regular BLR-1-4	BLR-5	
Sal. perm. men	\$1,291.58		\$ 1,291.58
Personal Services		\$7,487.00	7,487.00
Transportation	262.66	15.43	278.09
Contractual Services		246.79	246.79
Supplies and Material		918.14	918.14
Equipment	5.44	88.06	93.50
Total	\$1,559.68	\$8,755.42	\$10,315.10



TABLE 3

SUMMARY OF RIBES ERADICATION, 1942
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species				Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme		Man-Days	Ribes
Park-Headquarters	Second	Reproduction	134	39	2,876	581	558		4,015	.29	30
		Pole	127	79	376	964	535		1,875	.62	15
		Brush	39	52	13	973	67	2	1,055	1.33	27
		All Types	300	170	3,265	2,518	1,160	2	6,945	1.57	23
Two Medicine	First	Pole	247	256	23,371	132		5,793	29,296	1.04	119
		Stream	5	16	2,104	4		277	2,385	3.20	477
		All Types	252	272	25,475	136		6,070	31,681	1.08	126
	Second	Pole	90	93	11,318	250		5,658	17,226	1.03	191
		Subalpine	16	20	1,495	67		2,471	4,033	1.25	252
		All Upland	106	113	12,813	317		8,129	21,259	1.07	201
		Stream	32	156	46,233	14		25,259	71,506	4.88	2,235
		All Types	138	269	59,046	331		33,388	92,765	1.95	672
	All Workings	Pole	337	349	34,689	382		11,451	46,522	1.04	138
		Subalpine	16	20	1,495	67		2,471	4,033	1.25	252
		All Upland	353	369	36,184	449		13,922	50,555	1.05	143
		Stream	37	172	48,337	18		25,536	73,891	4.65	1,997
		All Types	390	541	84,521	467		39,458	124,446	1.39	319
Lake McDonald	First	Mature	10	29	630	226	4,618		5,474	2.90	547
		Mature	282	303	3,173	1,305	15,996		20,474	1.07	73
	Second	Stream	11	21	998	130	1,294		2,422	1.91	220
		All Types	293	324	4,171	1,435	17,290		22,896	1.11	78
	All Workings	Mature	292	332	3,803	1,531	20,614		25,948	1.14	89
		Stream	11	21	998	130	1,294		2,422	1.91	220
		All Types	303	353	4,801	1,661	21,908		28,370	1.17	94
All Areas	First	Pole	247	256	23,371	132		5,793	29,296	1.04	119
		Mature	10	29	630	226	4,618		5,474	2.90	547
		All Upland	257	285	24,001	358	4,618	5,793	34,770	1.11	135
		Stream	5	16	2,104	4		277	2,385	3.20	477
	Second	All Types	262	301	26,105	362	4,618	6,070	37,155	1.15	142
		Reproduction	134	39	2,876	581	558		4,015	.29	30
		Pole	217	172	11,694	1,214	535	5,658	19,101	.79	88
		Mature	282	303	3,173	1,305	15,996		20,474	1.07	73
		Brush	39	52	13	973	67	2	1,055	1.33	27
		Subalpine	16	20	1,495	67		2,471	4,033	1.25	252
		All Upland	688	586	19,251	4,140	17,156	8,131	48,678	.85	71
		Stream	43	177	47,231	144	1,294	25,259	73,928	4.12	1,719
		All Types	731	763	66,482	4,284	18,450	33,390	122,606	1.04	168
	All Workings	Reproduction	134	39	2,876	581	558		4,015	.29	30
		Pole	464	428	35,065	1,346	535	11,451	48,397	.92	104
		Mature	292	332	3,803	1,531	20,614		25,948	1.14	89
		Brush	39	52	13	973	67	2	1,055	1.33	27
		Subalpine	16	20	1,495	67		2,471	4,033	1.25	252
		All Upland	945	871	43,252	4,498	21,774	13,924	83,448	.92	88
		Stream	48	193	49,335	148	1,294	25,536	76,313	4.02	1,590
		All Types	993	1,064	92,587	4,646	23,068	39,460	159,761	1.07	161

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1942
GLACIER NATIONAL PARK

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
					Man-Days	Ribes
First	NP-Reg.	262	301	37,155	1.15	142
	NP-CCC	2,633	2,833	323,841	1.08	123
	Total	2,895	3,134	360,996	1.08	125
Second	NP-Reg.	731	763	122,606	1.04	168
All Workings	NP-Reg.	993	1,064	159,761	1.07	161
	NP-CCC	2,633	2,833	323,841	1.08	123
	Total	3,626	3,897	483,602	1.07	133



TABLE 5

SUMMARY OF RIBES ERADICATION, 1939-1942
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Men-Days	Ribes by Species				Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inermis		Men-Days	Ribes
Park Headquarters	First	Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
		Pole	284	122	13,428	15,364	8,967		37,759	.43	133
		Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003
		All Types	681	445	32,708	43,176	32,986		108,870	.65	160
	Second	Reproduction	134	39	2,876	581	558		4,015	.29	30
		Pole	127	79	376	964	535		1,875	.62	15
		Brush	39	52	13	973	67	2	1,055	1.33	27
		All Types	300	170	3,265	2,518	1,160	2	6,945	.57	23
	All Workings	Reproduction	492	243	12,745	7,053	16,224		36,022	.49	73
		Pole	411	201	13,804	16,328	9,502		39,634	.49	96
		Brush	78	171	9,424	22,313	8,420	2	40,159	2.19	515
		All Types	981	615	35,973	45,694	34,146	2	115,815	.63	118
Two Medicine	First	Pole	593	645	40,145	2,705	1,723	8,646	53,219	1.09	90
		Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
		All Upland	653	763	44,080	3,755	6,388	10,480	64,703	1.17	99
		Stream	54	480	30,429	438		12,592	43,459	8.89	805
		All Types	707	1,243	74,509	4,193	6,388	23,072	108,162	1.76	153
		Pole	90	93	11,318	250		5,658	17,226	1.03	191
	Second	Subalpine	16	20	1,495	67		2,471	4,033	1.25	252
		All Upland	106	113	12,813	317		8,129	21,259	1.07	201
		Stream	32	156	46,233	14		25,259	71,506	4.88	2,235
		All Types	138	269	59,046	331		33,388	92,765	1.95	672
		Pole	683	738	51,463	2,955	1,723	14,304	70,445	1.08	103
		Subalpine	76	138	5,430	1,117	4,665	4,305	15,517	1.82	204
	All Workings	All Upland	759	876	56,893	4,072	6,388	18,609	85,962	1.15	113
		Stream	86	636	76,662	452		37,851	114,965	7.40	1,357
		All Types	845	1,512	133,555	4,524	6,388	56,460	200,927	1.79	238
	First	Mature	1,410	913	21,077	4,253	34,175		59,505	.65	42
		Stream	11	39	5,184	35	1,602		6,821	3.55	620
		All Types	1,421	952	26,261	4,288	35,777		66,326	.67	47
Lake McDonald	Second	Mature	282	303	3,173	1,305	15,996		20,474	1.07	75
		Stream	11	21	998	130	1,294		2,422	1.91	220
		All Types	293	324	4,171	1,435	17,290		22,896	1.11	78
	All Workings	Mature	1,692	1,216	24,250	5,558	50,171		79,979	.72	47
		Stream	22	60	6,182	165	2,896		9,243	2.73	420
		All Types	1,714	1,276	30,432	5,723	53,067		89,222	.74	52
East Glacier	First	Pole	86	494	24,077	5,650	6,738	41,173	77,638	5.74	903
		Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
		Pole	963	1,261	77,650	23,719	17,428	49,819	168,616	1.31	175
All Areas	First	Mature	1,410	913	21,077	4,253	34,175		59,505	.65	42
		Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003
		Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
		All Upland	2,830	2,615	121,942	56,834	80,287	51,653	310,716	.92	110
		Stream	65	519	35,613	473	1,602	12,592	50,280	7.98	774
		All Types	2,895	3,134	157,555	57,307	81,889	64,245	360,996	1.08	125
	Second	Reproduction	134	39	2,876	581	558		4,015	.29	30
		Pole	217	172	11,694	1,214	535	5,658	19,101	.79	88
		Mature	282	303	3,173	1,305	15,996		20,474	1.07	75
		Brush	39	52	13	973	67	2	1,055	1.33	27
		Subalpine	16	20	1,495	67		2,471	4,033	1.25	252
		All Upland	688	586	19,251	4,140	17,156	8,131	48,678	.85	71
		Stream	43	177	47,231	144	1,294	25,259	73,928	4.12	1,719
		All Types	731	763	66,482	4,284	18,450	33,390	122,606	1.04	168
	All Workings	Reproduction	492	243	12,745	7,053	16,224		36,022	.49	73
		Pole	1,180	1,423	89,344	24,933	17,963	55,477	187,717	1.21	159
		Mature	1,692	1,216	24,250	5,558	50,171		79,979	.72	47
		Brush	78	171	9,424	22,313	8,420	2	40,159	2.19	515
		Subalpine	76	138	5,430	1,117	4,665	4,305	15,517	1.82	204
		All Upland	3,518	3,201	141,193	60,974	97,443	59,784	359,394	.91	102
		Stream	108	696	82,844	617	2,896	37,851	124,208	6.44	1,150
		All Types	3,626	3,897	224,037	61,591	100,339	97,635	483,602	1.07	133

COOPERATION WITH THE SOIL CONSERVATION SERVICE

By
M. C. Riley
Associate Forester

During the course of the spring and early summer two survey jobs were undertaken by this Bureau at the request of the Soil Conservation Service to furnish data concerning white pine blister rust and ribes conditions on specific areas. One request was for a survey of the Soil Conservation Service nursery at Bellingham, Washington, and the other was in connection with the farm wood lot program in the Kootenai County Soil Conservation District in Idaho.

Bellingham Nursery

This nursery of approximately 75 acres is located at the north city limits of Bellingham, Washington, and is the old Bureau of Plant Industry Bulb Nursery plus recent additions. It was planned to plant enough seed to raise approximately 10,000 western white pine.

A survey was made of the nursery including a surrounding protection strip, on May 12 and 13, 1942. No blister rust infection was found and there were few ribes within infecting distance. These consisted of Ribes lacustre and R. sanguineum, and it was estimated that their removal would require approximately 20 man-days.

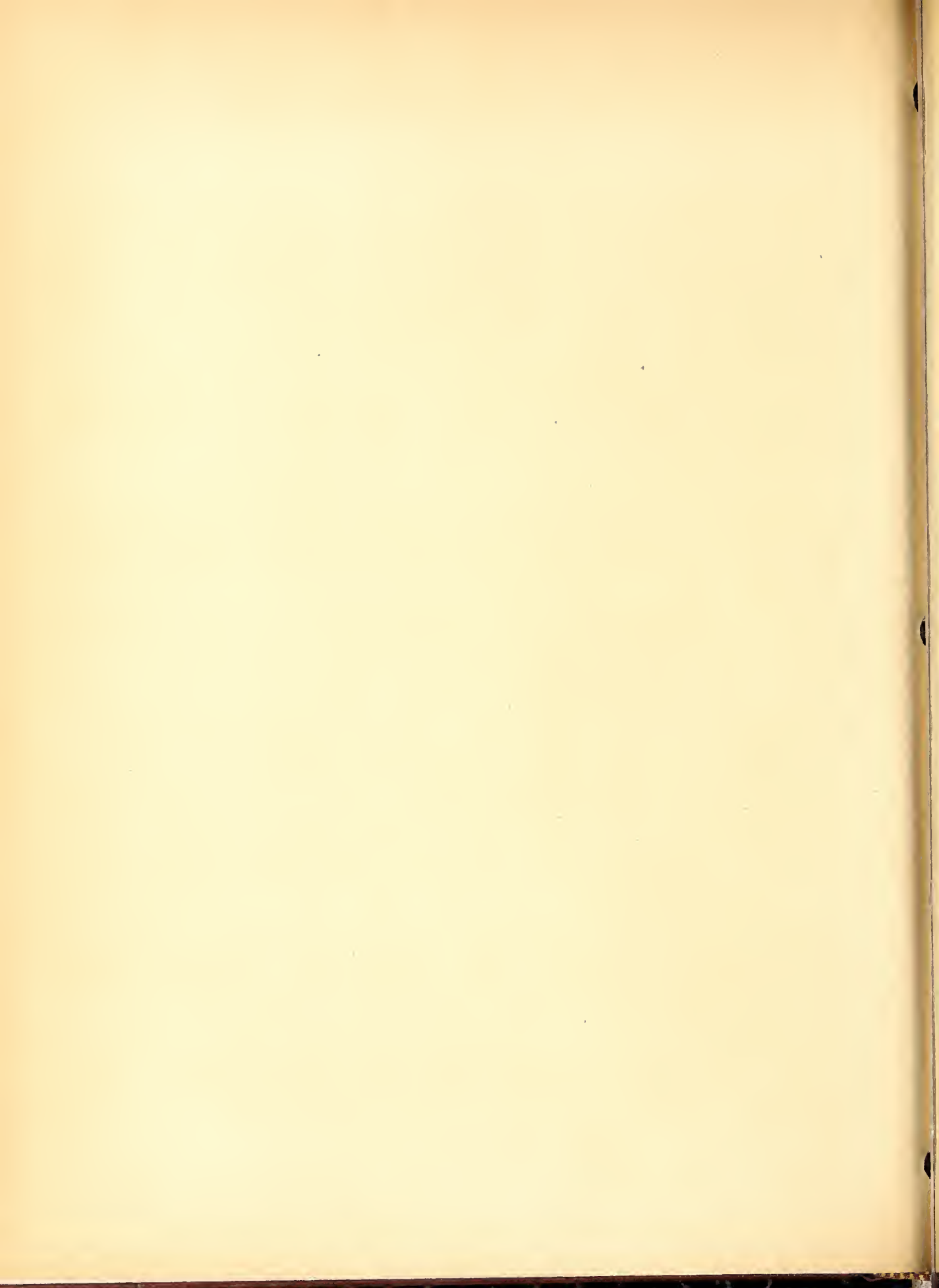
A detailed report was submitted and copies are in the files of this Bureau.

Farm Wood Lots in Kootenai County Soil Conservation District in Idaho

An inspection of designated farm wood lots containing white pine was conducted during the months of April and May to determine the amount of blister rust infection and ribes on the areas. In reproduction stands trees were thoroughly examined for blister rust infection and in pole and mature stands the trees were observed for flags. Ribes population and distribution were determined by a strip sampling method on the wood lots and on a surrounding protection zone. The interval between strips was adjusted to show adequately the ribes conditions, and check strips and ribes data were plotted on a map for each area. During the course of the survey 530 acres were examined on 18 fields of 13 properties.

All types of working conditions, ribes concentrations and infection were found ranging from ribes-free area with no apparent infection to areas which have many ribes, and which are so heavily infected with blister rust that practically every tree will be lost.

In the detailed report submitted to the Soil Conservation Service, a map of the area surveyed on each property was supplied, and the blister rust problem was described. Copies of the detailed report are to be found in the files of this Bureau.



BLISTER RUST PLOT STUDIES

By

C. R. Stillinger
Assistant Pathologist

INTRODUCTION

As a part of the program to control white pine blister rust in the Inland Empire, studies of this disease on permanent plots were continued in 1942. The objective of these studies is to obtain information which will aid in a better understanding of the development of the rust under natural conditions and the effect upon this development of the various control operations. Due to the life history of the rust these plot studies must be continued for a rather long period in order to obtain reliable results. The observations each season, therefore, are only fragmentary indications of the trends of the studies and cannot be taken as conclusive. The pertinent information, which has been obtained during this past season, is given in the discussion of the various individual plots or combination of plots.

BLISTER RUST CONDITIONS IN 1942

The past summer was characterized by about normal temperatures, but a deficiency of moisture during all the summer months except June. August and September were dry so that very little opportunity was present for pine infection. Occasional rains throughout the summer provided favorable conditions for the intensification of the rust on ribes and for the germination of the telia. This greater intensification of the rust on ribes in comparison with that of previous seasons is shown in table 1. In this table the amount of infection has been reduced to square inches of infection per infected leaf and per foot of all live stem found on the plot in order to make the data comparable. Records are given for as many years as data are available for the several plots.

TABLE 1

AMOUNT OF BLISTER RUST FOUND FOR SUCCESSIVE YEARS
ON STUDY PLOTS DISTRIBUTED OVER NORTHERN IDAHO

Plot	Operation	Sq. In. Infection Per Infected Leaf				Sq. In. Infection Per FLS			
		1939	1940	1941	1942	1939	1940	1941	1942
Powder House Plot	Clearwater	.153	.152	.199	.283	.374	.316	.301	.860
Trail Creek Plot 4	Clearwater	.180	.312	.487	.632	.784	2.061	3.836	4.235
Trail Creek Plot 6	Clearwater		.067	.057	.090		.081	.279	.509
Trail Creek Plot 7	Clearwater		.087	.093	.058		.187	.529	.671
Hollywood Plot 9	Clearwater		.209	.121	.146		1.113	.415	.484
East Emerald Plot 18	St. Joe	.024	.023	.025	.078	.011	.006	.073	.348
East Emerald Plot 20	St. Joe	.105	.064	.344	.397	.207	.044	.993	.624
East Emerald Plot 21	St. Joe			.061	.077			.326	.510
Kalispell Cr. Plot 24	Kaniksu			.090	.127			.230	.389
Kalispell Cr. Plot 25	Kaniksu			.051	.075			.062	.406
Kalispell Cr. Plot 26	Kaniksu			.022	.061			.009	.165
Average		.116	.131	.141	.184	.344	.544	.641	.831

From the table it is evident that whether the amount of infection per infected leaf or per feet of live stem is used as a basis for comparison the general trends are very much the same.

The most interesting point revealed by these data is the gradual increase in the amount of rust each season. There are two probable reasons for this increase, both of which have contributed as causes: (1) that there has been a gradual increase in the amount of aeciospores on and in the vicinity of the plots and (2) the ecological conditions each year have been more favorable than those of the previous season for the intensification of the rust on ribes. Since the plots are on three separate operations, the data suggest that approximately the same development of the rust on ribes may prevail over all of the Inland Empire white pine area. These data suggest that in an area with some pine infected with blister rust the ribes should be eradicated as rapidly as possible.

PERTINENT RESULTS FROM INDIVIDUAL PLOTS

Kalispell Creek Plots 24, 25 and 26

These three plots on the Kaniksu operation were located last year in 1933 white pine plantings and a preliminary report given of the results obtained from the initial survey. This year all details in the establishment of the plots were completed, a careful inspection and record were made of all infected pine, the ribes were eradicated from a protection zone of five chains around each plot and the ribes were reduced to a definite standard which is to be maintained annually on each plot. Because of local conditions the areas of plots 24 and 26 were increased slightly in size and plot 24 was divided into three subplots. Following are some of the detailed findings for this season:

Pine Infection

All white pine on the plots were inspected, the infected trees and all cankers were numbered and detailed records taken on the trees and cankers. Furthermore, all branch cankers were cut off which were close to the trunk and were on trees which did not already have trunk cankers. This practice will be continued and limb cankers will be removed before entering the trunk on trees that do not already have trunk cankers. This procedure is for the purpose of maintaining an adequate stocking of pine on the plots on which to study future spread of infection from ribes. The results of this inspection are given in table 2.

TABLE 2

SUMMARY OF PINE INFECTION, CUTTING OUT OF CANKERS,
AND RIBES CONLITIONS ON KALISPELL CREEK PLOTS

Items		Plot 24				Plot 25	Plot 26
		Part I	Part II	Part III	All		
Area - Acres		7.1	19.2	7.4	33.7	9.2	13.1
White Pine	Total	1,910	3,483	1,046	6,479	3,052	5,295
	No. Per Acre	269	181	141	192	332	404
	Per Cent Infected	7.43	5.89	14.39	7.77	5.24	4.6
	No. Cankers	149	218	231	598	175	309
	No. Cankers Per 100 Trees	7.8	6.3	22.1	9.2	5.7	5.8
	No. Trees With Limb Cankers Only	31	72	44	147	27	75
	No. Trees - Limb Cankers Removed	27	56	23	106	26	50
	Per Cent Infected Trees - Limb Cankers Removed	19.0	27.3	14.7	21.0	16.3	20.4
	Per Cent Infected Trees With Trunk Cankers	78.2	64.9	71.8	70.8	83.1	69.3
Ribes	No. Per Acre	2.1	1.8	14.5	5.2	2.9	7.9*
	No. Per Acre After Reduction	1.1*	.9	2.7**	1.4	1.2*	2.9*
	Feet Live Stem Per Acre	21.1	22.9	366.1	97.8	159.4	216.1
	Feet Live Stem Per Acre After Reduction	11.8*	15.6	17.1*	15.3	21.1*	11.5*

*All Ribes lacustre**All R. viscosissimum

From table 2 the following points may be observed:

1. The plots differ considerably in size. This difference was necessitated by general topography of each location.
2. The infection of part I of plot 24 and plots 25 and 26 was spread from R. lacustre with from two to eight ribes per acre and from 21 to 216 feet of live stem per acre.
3. The percentage of infection does not appear to be correlated with either the number of ribes or feet of live stem per acre. From studies made on other plots it appears that the distribution of the rust on the pine is characteristic for the introductory phase of the rust.
4. Limb cankers which were close to the trunk were removed from 20 per cent of all the infected trees on all three plots.
5. Seventy-two per cent of all the infected trees on all three plots had trunk cankers.

Establishment of Experimental Standards

In order to determine the influence of small amounts of ribes and feet of live stem upon the transfer of blister rust to pine approximate standards were established for each plot. The number of ribes was reduced approximately to standard by eradicating some of the bushes. If possible, each plot was reduced to a single species of ribes. The live stem on the bushes which were left was and will be pruned back in early July in order to obtain approximately the same amount of live stem each year. The program and results for this past season are indicated in table 3.

TABLE 3

REDUCTIONS OF RIBES ON PLOTS TO SPECIFIC STANDARDS

Plot	Original Per Acre		Standard Per Acre		Ribes Species	July Reduction and Pruning Per Acre		August Inspection Per Acre	
	Ribes	FLS	Ribes	FLS		Ribes	FLS	Ribes	FLS
24-1	2.1	21	1	10	lacustre	1.1	11.8	1.1	11.8
24-2	1.8	22	1	16	lacustre and viscosissimum	.9	15.6	.9	15.6
24-3	14.5	366	3	16	viscosissimum	2.7	14.0	2.7	17.1
25	2.9	159	1.3	20	lacustre	1.2	15.8	1.2	21.1
26	7.9	216	2.3	10	lacustre	2.9	8.96	2.9	11.5

Pruning of ribes, in order to reduce the feet of live stem to near the standard, was done on plot 24, part 3, and plots 25 and 26. In each case where pruning of the ribes was done the feet of live stem was reduced in July under the standard, but there was from 20 to 33 per cent increase when the ribes were inspected in August over that left in July. This increase was due probably to stimulation from the pruning as well as natural growth. These results suggest that maintaining feet of live stem standards by means of pruning can be done only within rather broad limits.

Protection Zone

In order that the results from the plots may be more certain the ribes in a zone of five chains width around each plot were eradicated. Table 4 gives a summary of the results of this eradication.

TABLE 4

RIBES FOUND IN FIVE CHAIN WIDE PROTECTION
ZONE AROUND THE PLOTS

Plot	Area- Acres	Ribes Species	Ribes		Feet of Live Stem	
			Total	Per Acre	Total	Per Acre
24	66.2	R. lacustre	61	.9	705	10.6
		R. viscosissimum	614	9.3	16,388	247.6
		Total	675	10.2	17,093	258.2
25	22.1	R. lacustre	46	2.1	671	30.4
26	38.1	R. lacustre	97	2.6	1,867	49.0
		R. viscosissimum	1		45	1.2
		Total	98	2.6	1,912	50.2
Total	126.4		819	6.5	19,676	155.7

Comparing these results with the ribes found on the plots (table 2) it may be observed that the ribes population around plot 24 is twice that on the plot and the feet of live stem 2.6 times. This difference was due to a heavy concentration of ribes in one area on the west side of the plot and another on the northeast corner of the plot. This concentration extended into the northeast corner of the plot. It will be necessary to rework these two areas again next year. In the case of plot 25 the surrounding area did not have quite as many ribes per acre or as much live stem as was found on the plot. The considerable difference in live stem was due to a few large ribes found along the small stream on the plot.

Fewer ribes and feet of live stem per acre were found around plot 26 than on the plot itself. This was due to the swampy area on the plot on which a considerable concentration of ribes was found. Since the areas involved in this plot work are fairly large, the results from the careful examination of the areas both on the plots and around them for ribes should be of interest. For this reason all these data are summarized in table 5.

TABLE 5

SUMMARY OF ALL RIBES AND FEET OF LIVE STEM
FOUND ON AND AROUND THE PLOTS

Plot	Area- Acres	Ribes		Feet of Live Stem	
		Total	Per Acre	Total	Per Acre
24	99.9	351	3.5	20,391	204
25 and 26	82.5	274	3.3	6,881	83
Total	182.4	1,125	6.2	27,272	150

Since plots 25 and 26 are contiguous on one side the data for these two have been combined. Plot 24 is about one-quarter mile northwest of the plot 25 to 26 area. Both areas had been burned over and were planted in 1923 with white pine. The ribes on the areas had not been eradicated previous to this study. These plots are also of particular value in studying the development of the rust because they are located in an area with relatively light ribes populations, varying from widely scattered ribes to small but heavy ribes concentrations. Such conditions represent special problems in both checking and eradication.

Trail Creek Plots 7 and 8

Both of these plots are on the Clearwater operation. The purpose of plot 7 is to study the infecting power of a single R. petiolare. Plot 8 is a study of a light distribution of R. lacustre. Both are well stocked with open reproduction. The plots were established in 1933 after the ribes had been eradicated from the area in 1933 and 1935. The plot areas were searched for ribes again in 1938, 1939 and 1942. The results of these last three eradications are given in table 6. This table indicates the difficulty which has been encountered in establishing a ribes-free area on these plots.

TABLE 6
RIBES REMOVED ON LAST THREE ERADICATIONS
ON TRAIL CREEK PLOTS 7 AND 8

Plot	Number Ribes and FLS Found Per Acre for Same Area					
	1938		1939		1942	
	Ribes	FLS	Ribes	FLS	Ribes	FLS
7	9	17	13	26	10	11
8	46	59	15	13	13	30

Of course, until all ribes have been removed from the area any pine infection which develops on the white pine cannot be charged definitely to the ribes which have been left for study. However, a careful record is kept of the location of all ribes which have been eradicated so that the relation of these ribes to any infection which develops may be determined.

Trail Creek Plot 6 and East Emerald Creek Plot 21

Trail Creek plot 6 on the Clearwater operation and East Emerald Creek plot 21 on the St. Joe operation both have the same objective, that is, a study of the infecting power of a R. lacustre population. The original population has been maintained until the 1942 season. This year all bushes were removed that were over approximately six inches high and had more than one foot of live stem. As a result of this eradication the plots for the next few years represent a study of the survival and infecting power of dwarf R. lacustre. In the case of plot 6, 48 per cent of the ribes and 87 per cent of the live stem were removed. For plot 21, 55 per cent of the ribes and 89 per cent of the live stem were removed.

Hollywood Plot 9

Hollywood plot 9 is a study of the development of blister rust on very young white pine reproduction on a cutover area. The white pine average about ten years old. A record has been kept of all ribes which have been found on this plot since 1939. Some new ribes have been found each year so that there has been a gradual increase in the number of ribes and the feet of live stem as shown in table 7.

TABLE 7

HISTORY OF RIBES POPULATION ON HOLLYWOOD PLOT 9

			1940			1942	
			Total	Reduced to		Total	Reduced to
	1938	1939			1941		
Ribes							
Per Acre	34	46	54	23	27	31	19
FLS							
Per Acre	113	191	254	96	123	144	19

Most of these new ribes are four to six year old dwarf plants which for some reason have not been found previously. Two reductions of the ribes have been made, one in 1940, the other in 1942, by eradicating some of the ribes. In 1942 a reduction in live stem was accomplished by pruning some of the bushes which were left.

During the fall of 1942 all the pine on the plot were inspected for white pine blister rust. Approximately 20 per cent of the trees was found to be infected. Since there are approximately 9,800 trees per acre, this infection has not caused any damage to the stocking of the area. Nearly nine per cent of infected trees have died during the last two years, mostly from infection which occurred in 1937.

NEW PLOTS

Hanna Road Plots 29 and 30

An area was found along the Hanna Road on the Kaniksu operation which offered an opportunity to obtain some information on the natural spread of white pine blister rust on a level area. The area originally supported a dense stand of mature timber. In 1935 and 1936 the decadent hemlock and fir was felled and all slash was piled and burned leaving an open stand of mature white pine with very little ground cover. Two locations with a small number of ribes in the center were chosen for plot studies. Since young pine one and two years old were quite abundant, all pine within two chains of the ribes were staked and inspected. Although a few pine were found with symptoms similar to those of white pine blister rust, the pine were so young that positive identification was not possible. Some ribes other than those in the center of the plots were found and eradicated. It will be necessary to eradicate the ribes from the plots again next spring as well as establish a protection zone around the plots.

SUMMARY

1. The climate this last summer probably was not especially favorable for the infection of white pine by blister rust.
2. There has been a progressive increase in the amount of rust on ribes for the last four years.
3. Two to eight ribes per acre with 20 to 216 feet of live stem may initiate a serious amount of infection in young planted white pine.
4. Limb cankers which were close to the trunk were removed from 20 per cent of the infected trees.
5. Seventy-two per cent of the infected trees had trunk cankers.
6. Maintaining a certain foot of live stem standard on an area by means of pruning may be possible only within very broad limits.
7. The ribes population and distribution such as found on and around Kalispell Creek plots 24, 25 and 26 present special problems in both checking and eradication.
8. The establishment of ribes-free conditions is especially difficult on some areas such as Trail Creek plots 7 and 8.
9. The R. lacustre on two plots, one on the Clearwater operation and one on the St. Joe operation, have been reduced to those bushes six inches or less in height and with less than one foot of live stem in order to determine the survival and infecting power of dwarf bushes of this species.
10. Two new spread plots were established in 1942.

DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION AND PROGRESS
OF RIBES ECOLOGY WORK IN THE NORTHWESTERN REGION FOR 1942

By

V. D. Moss, Associate Forest Ecologist
and H. R. Offord, Pathologist

I. SUMMARY

A. Improvement in Methods of Ribes Eradication

1. Status of work. Field experiments have been completed for two eradication studies, namely: (a) "The interrelation between size of crew, width of crew strip and method of laying string line on ribes eradication," and (b) "A comparison between two methods of employing crews in a gang formation on ribes eradication." Special reports will be prepared on these two subjects upon completion of statistical analyses contemplated for the winter of 1942-1943.

(a) The study on size of crew, width of crew strip and method of laying string line incorporates the one, two and three-man crews working strip widths of 6, 12 and 24 feet per man with crews laying their own string line and with string line prestrung. The three-man crew working an approximate interval of 12 feet per man with string line prestrung resulted in the higher efficiency and the more reasonable costs. The efficiency of this crew formation was followed closely by the two-man crew working 12 feet per man, a good second choice. The one-man crew should never be used except for scouting out areas of light working conditions.

(b) The comparison between the two methods of employing crews in a gang formation, 4 three-man crews with crew leaders working in line and 3 four-man crews with crew leaders working behind three crewmen, proved the latter method to be more efficient in the elimination of light ribes populations and at comparable costs to the 4 three-man gang formation of crews. This increase in efficiency was accomplished by closer supervision of individual crewmen, by crew leaders directing the larger proportion of their searching time to ribes areas or sites on which ribes had been located by the crewmen, by searching systematically the entire crew strip for missed ribes, by keeping in mind the dozen or more common sites where ribes are most likely to be missed and by crew leaders approaching these sites from angles hitherto not traversed by the crewmen.

2. Future work. Eradication studies will be discontinued for the duration because of the complexity of the labor situation. Instead, close cooperation will be maintained with the control operations in working out field problems on the job in methods of ribes eradication. In addition, work has commenced on the preparation of an outline for a crew leaders' manual which will cover in a concise and illustrated manner all phases of the training program which are prerequisites to an efficient job of ribes elimination in light populations.

B. Effects of Grazing on Regeneration of Ribes and Western White Pine

1. Status of work. A series of four grazing studies have been established covering the subjects: (a) "Effects of grazing recent cutover lands on . . . seedlings," (b) "Effects of deferred grazing on . . . seedlings," (c) "Effects of controlled grazing on the germination, growth and development of ribes and western white pine seedlings" and (d) "Effects of continued seasonal grazing of old logged and burned-over lands on the regeneration of ribes and western white pine seedlings." Study areas are in most cases examined twice a season, before and after grazing by sheep. During each inspection the number of new seedlings, mortality of established bushes and many morphological studies on development of ribes and western white pine seedlings are recorded. Most of these grazing studies are being carried on in cooperation with the Forest Service, School of Forestry of the University of Idaho, and the Potlatch Timber Protective Association.

(a) The effects of grazing sheep on recent cutover lands have shown that the disturbance caused by trampling causes no significant increase of ribes populations from the occurrence of new seedlings, that many ribes under three years of age are destroyed by sheep, that many leaves and some live stem are removed each season, that no significant damage or loss results to white pine seedlings on slopes of less than 40 per cent under moderate rates of grazing and that, in many instances, the regeneration of white pine seedlings is appreciably favored by having sheep continually disturb the forest floor. Looseness of forest floor appears to encourage seed germination.

(b) The effect of deferring grazing from cutover lands which have been under range use by sheep has resulted in much ribes regeneration on the protected or ungrazed areas on the better sites. The reason for ribes seed germinating does not appear to be significantly associated with the disturbance resulting from moderate rates of grazing in the region. On the other hand, the number of western white pine seedlings germinating has been observed to be generally increased by the continued seasonal trampling of sheep over cutover lands that would otherwise tend to early development of a sod. Forest lands in this latter condition are not favorable to the germination or establishment of western white pine seedlings.

(c) The effects of controlling the intensity of grazing by sheep on cutover lands have shown that a state of overgrazing, a rate of 14 acres per animal unit, creates a condition encouraging to the germination of ribes seedlings. Much damage and loss of western white pine seedlings can also be expected on areas heavily grazed, regardless of topography. It has been found that when the intensity overruns the animal unit capacity of an area, grazing by sheep not only becomes detrimental to the sustained range yield but also is likely to produce a ribes problem and create a condition unfavorable for the establishment of a fully stocked stand of white pine reproduction.

(d) The effects of grazing sheep year after year on old logged and burned-over areas, that have become moderately sodded, appear to have little or no influence on stimulating ribes regeneration. Grazing of these old cutover lands may be found advantageous in creating a condition favorable for the regeneration of western white pine. The disturbance caused by trampling of sheep over these areas tends to keep the forest floor loose, a condition that is believed to favor the high germination and survival of white pine seedlings. Many of these old cutover lands are at present inadequately stocked with reproduction that originated following broadcast burning. A large number of these young trees are commencing to bear cones and throw seed as evidenced by the occurrence of many new seedlings over the areas. Nearly all the new pine seedlings observed are germinating on ground moderately disturbed by the trampling of sheep.

2. Future work. The establishment of new grazing subprojects in the near future is not contemplated. The present program will be maintained with all ribes being removed from the plot areas upon completion of five years' bush study. The plots will continue to be maintained thereafter and examined during the years of early succession and development of the forest stand originating on these cutover lands. One new grazing project not yet reported has been established in the Clearwater Forest by the School of Forestry, University of Idaho, in cooperation with the Clearwater Timber Protective Association. Ribes ecology studies will be initiated next season on this area in response to the request of the above agencies.

C. Ecological Studies of Ribes and Western White Pine Regeneration

1. Status of work. Numerous problems in ecology have confronted the methods project over the last five years on subjects relating to blister rust control measures, methods of slash disposal, stand improvement practices in immature stands and major harvest or improvement cuttings in mature stands of western white pine. Those that are currently reported on are: (a) "The effects of variable light and moisture conditions on the germination, growth and development of Ribes viscosissimum, R. lacustre and Pinus monticola," (b) "Resprouting habits of R. lacustre," (c) "Ribes regeneration key for the western white pine region," and (d) "Slash disposal measures and their effects upon ribes and western white pine regeneration."

(a) The study of variable light and moisture conditions on the germination, growth and development of ribes and western white pine seedlings was established under full sun, half shade and full shade light intensities. At each light station seed of ribes and pine were sown on natural duff, mineral and burned-mineral soil surfaces. Major results obtained after two seasons' study have shown that soil surfaces control the amount of seed germination as does the intensity of available light; establishment of germinated seeds is not appreciably affected by either soil surface or the intensity of light; morphological development of ribes is many-fold greater on burned-mineral than on mineral soil surfaces; mortality of ribes seedlings is greatest during the winter months; nearly all germination of new R. viscosissimum seed is complete by the end of the first season; peak of germination for new

R. lacustre seed is not reached until the second season; and white pine seedlings were found to be more tolerant to conditions of shade than either species of ribes.

(b) The asexual study of R. lacustre was undertaken to determine the size and portion of root capable of resprouting under variable conditions. Three treatments were employed: (1) roots cut leaving crown tissue attached, (2) roots cut about one inch below the crown and (3) roots cut six inches below crown. These treatments were established on both a north and south exposure during the spring, summer and fall seasons. A late fall inspection of the spring and summer treatments showed resprouting restricted to roots with crown tissue and with the higher per cent of roots resprouting on a south exposure. The final check for number of asexually developed bushes will not be made until the middle of next season to provide sufficient time for all resprouting to take place.

(c) A ribes regeneration key has been developed for this region to provide a satisfactory method of judging the potential ribes seedling contingency associated with areas being given protection. This is being accomplished by systematizing ecological knowledge which may either influence or indicate conditions suitable for ribes seedling survival. A key such as this which is largely based on vegetative associations can only be satisfactorily developed after much field sampling has been undertaken throughout the entire region. Extensive information secured during the past two seasons is now being used to reclassify and adjust original weights assigned to the various vegetative classes comprising the key.

(d) Studies of slash disposal measures in the western white pine type are being carried on in cooperation with the Forest Service, Potlatch Forests, Incorporated and the Slash Disposal Committee of the Inland Empire Section of the Society of American Foresters. One of the most promising methods developed is that of partial disposal. Logging slash is piled and burned along right of ways, along ridges, and occasionally a fire lane is built between ridges to break up the main body of slash into units of around five acres each. This method substantially reduces the hazardous fuel on an area, thus reducing the fire hazard to an acceptable standard, and prevents significant destruction of scattered seed trees. With this reduced burning of slash, few ribes seedlings have been found germinating on these areas in comparison with those on which all slash is piled and burned. Those that have become established are found around edges of burned slash piles and along skid trails. Pine seedlings, on the other hand, are germinating at random over the entire area without respect for soil surface. Ribes eradication work on such areas will be reduced to a minimum and restricted almost entirely to skid trails and burned slash piles. The leaving of white pine seed trees on these areas will assure adequate stocking of reproduction.

II. FIELD WORK

A. Improvement in Methods of Ribes Eradication

The Interrelation Between Size of Crew, Width of Crew Strip and Method of Laying String Line on Ribes Eradication

A preliminary report describing experimental procedures employed in the establishment of this study is given on pages 114 to 116 of the 1941 annual report. Below is an arithmetical summary presenting methods data for the St. Joe tests in table 1 and for the Clearwater tests in table 2.

TABLE 1

SUMMARY OF PLOT DATA FOR THE ONE, TWO AND THREE-MAN CREWS
WORKING INTERVALS OF 6, 12 AND 24 FEET WIDE PER MAN
WITH CREWS LAYING THEIR OWN STRING LINE AND WITH STRING LINE
PRESTRUNG IN OPEN REPRODUCTION TYPE ON THE ST. JOE OPERATION

Size of Crew (No. Men)	Width of Crew Strip (Feet)	Average Ribes Per Acre			Man-Days Per Acre of Work Time	Per Cent Ribes Missed Per Acre
		Pulled	Missed 2 x ch.	Total		
Crews Laying Own String Lines						
1	6	85.14	15.70	100.84	1.477	15.6
	12	70.65	27.59	98.24	.927	28.1
	24	56.88	35.43	92.31	.485	38.4
2	12	71.70	28.86	100.56	1.330	28.7
	24	76.20	13.20	89.40	.959	14.8
	48	49.34	29.45	78.79	.839	37.4
3	18	67.60	13.30	80.90	1.077	16.4
	36	69.65	29.64	99.29	.873	30.0
	72	66.91	31.48	98.39	.736	32.0
String Lines Prestrung						
1	6	70.73	27.01	97.74	1.153	27.6
	12	79.23	19.21	98.44	.935	19.5
	24	56.80	32.68	89.48	.573	36.5
2	12	79.97	19.22	99.19	1.294	19.4
	24	82.46	16.74	99.20	1.021	16.9
	48	70.81	26.89	97.70	.886	27.5
3	18	82.14	15.17	97.31	1.286	15.6
	36	67.27	11.70	78.97	.745	14.8
	72	62.01	32.99	95.00	.701	34.7

Under the method of crews laying their own string line the one-man crew accomplished the higher standard of work on a 6-foot strip width. His efficiency decreased as the width of strip increased toward the maximum of 24 feet. The two-man crew obtained the higher efficiency on the 24-foot strip width, an interval of 12 feet per man. The three-man crew is observed to have accomplished the more efficient job on the 18-foot strip, an interval

of 6 feet per man. During the progress of field work it was noted that with three men in this narrow 18-foot lane there was only room enough for two men to profitably work with the third man disposed in the job of laying string line and attempting to keep in formation. When the strip for the three-man crew was extended to a width of 36 and then 72 feet, the efficiency of their work noticeably declined. It is interesting to note, however, that the per cent of bushes missed on the 36-foot strip width was comparable to the per cent of bushes missed on the 72-foot strip.

Under the method of having string line prestrung, the one-man crew is observed to have done his more efficient work on the 12-foot strip. It is also noted that the higher standard of work by the two and three-man crews was accomplished on strips when each man covered an interval of 12 feet. The higher efficiency on ribes eradication with string line prestrung was accomplished when each crewman covered an interval of approximately 12 feet regardless of the size of the crew. Prestringing thus permitted each crewman to cover more ground area with higher efficiency and comparable costs to the method of crews laying their own string line. From this study it appears that the job of string laying should be independent of the job of ribes eradication to obtain the maximum standard of work.

Costs of both methods of string laying when expressed as the number of man-days expended per acre decreased as the width of strip increased for all sizes of crews studied. Costs of crew sizes between methods show no appreciable variation. On the expendable basis of one man-day per acre more was accomplished on the job of ribes eradication with string line prestrung for nearly all crew sizes working the three different crew strips. This study in methods of ribes eradication conducted in open reproduction type on the St. Joe Forest shows that higher efficiency and lower costs are obtained by employing the three-man crew working an approximate strip width of 36 feet, an interval of 12 feet per man with string line prestrung.

An interesting photo comparison between size of crews and width of crew strips is shown in plates I, II and III. Plate I shows the one-man crew working a 6-foot (W-132), 12-foot (W-133) and 24-foot (W-136) strip. Plate II shows the two-man crew working a 12-foot (W-134), 24-foot (W-139) and 48-foot (W-141) strip. Plate III shows the three-man crew working an 18-foot (W-135), 36-foot (W-140) and 72-foot (W-142) strip.

PLATE I



Between white markers is perspective of ground that a one-man crew must search in ribes eradication on strips 6-feet (W-132), 12-feet (W-133), and 24-feet (W-136) wide.



between white markers is perspective of ground that a two-man crew must search in ribes eradication on strips 12-feet (A-134), 24-feet (A-139), and 48-feet (A-141) wide.



Between white markers is perspective of ground that a three-man crew must search in rice eradication on strips 14-feet (W-135), 36-feet (W-140), and 72-feet (W-142) wide.

TABLE 2

SUMMARY OF PLOT DATA FOR THE ONE, TWO AND THREE-MAN CREWS
WORKING INTERVALS OF 6, 12 AND 24 FEET WIDE PER MAN
WITH CREWS LAYING THEIR OWN STRING LINE AND WITH STRING LINE
PRESTRUNG IN CUTOVER TYPE ON THE CLEARWATER OPERATION

Size of Crew (No. Men)	Width of Crew Strip (Feet)	Average Ribes Per Acre			Man-Days Per Acre of Work Time	Per Cent Ribes Missed Per Acre
		Pulled	Missed 2 x ch.	Total		
Crews Laying Own String Lines						
1	6	39.25	59.78	99.03	.912	60.4
	12	37.18	61.61	98.79	.746	62.4
	24	42.36	57.10	99.46	.562	57.4
2	12	38.38	53.12	91.50	1.003	58.1
	24	33.27	46.01	79.28	.685	58.0
	48	39.13	28.67	67.80	.839	42.3
3	18	64.00	27.91	91.91	1.375	30.4
	36	47.18	53.81	100.99	.790	53.3
	72	37.71	62.97	100.68	.620	62.5
String Lines Prestrung						
1	6	39.89	58.90	98.79	.849	59.6
	12	56.25	43.32	99.57	1.003	43.5
	24	51.79	36.80	88.59	.788	41.5
2	12	45.17	46.49	91.66	1.179	50.7
	24	41.88	38.20	80.08	.791	47.7
	48	61.70	24.92	86.62	.836	28.8
3	18	55.66	37.47	93.13	.926	40.2
	36	54.45	30.22	84.67	1.016	35.7
	72	37.75	45.03	82.78	.712	54.4

This methods study undertaken on the Clearwater Forest was established in a fairly recent and heavy, partially cutover area having a preponderance of small ribes bushes. The effect of bush size on crew efficiency is well illustrated by comparing per cent ribes missed in tables 1 and 2. The St. Joe data in table 1 relates to older and larger bushes in open reproduction.

Under the method of having crews lay their own string line the efficiency of work is observed to have varied but slightly in table 2 between size of crews and width of crew strips. The one exception that can be pointed out is the work of the three-man crew on an 18-foot strip. The three-man crew laying its own string line on an 18-foot strip also performed more efficiently on the St. Joe tests than when working the 36 or 72-foot lanes. In this cutover type where visibility was fairly good in so far as laying string line was concerned it was not realized that the string ball man would be responsible for the lowering of efficiency as is shown in table 2. With string line prestrung on this cutover area much general improvement was obtained in the standard of work for nearly all sizes of crews and width of crew strips. Notable among these was the work of the two and three-man crews.

At present arithmetical variations shown in both tables 1 and 2 cannot be readily interpreted. These data must be subjected to an analysis of covariance before it can be determined what has been responsible for variance factors within and between methods, crews and strip widths. It can be generally stated, however, at this time that in performing ribes eradication work on cutover lands having many small ribes, string line should be prestrung if animals such as sheep or deer are not likely to tear them out before the crews have worked the area. The three-man crew should be used in preference to the two-man crew although the latter is a good second choice. The one-man crew should never be used except for scouting out areas. The higher efficiency will be obtained when each man covers an approximate interval of 12 feet. This strip or interval width can vary, however, from 10 to 16 feet without affecting the efficiency of the work. Proper width of crew strip should be regulated in accordance with density of ground cover, size of ribes bushes and somewhat by class of labor.

A Comparison Between Two Methods of Employing Crews in a Gang Formation on Ribes Eradication

This study was established on 35 acres of cutover land having a small ribes problem in the Clearwater Forest. During the past few years it has become necessary to employ crews in a gang formation in order to obtain adequate supervision of inexperienced labor. A general practice has been the use of 3 or 4 three-man crews in a gang formation under the supervision of an assistant camp boss. Crews used in this formation are composed of one crew leader and two crewmen for each crew unit. String lines are usually prestrung for this formation, although in light working conditions crews often lay their own string line. This formation was observed to be doing quite satisfactory work in medium to heavy ribes population but failed to function properly on areas of light to medium ribes populations. After carefully studying what might be considered the many faults associated with this method, a new formation was developed in an attempt to increase the efficiency of ribes eradication for second, third, etc. workings.

The new method or formation was composed of thirteen men just as in the old formation. This size of gang formation is well adapted to a 33-man camp because with a full camp there are enough men to fill two gangs, one being assigned to each assistant camp boss. In the new formation three crews composed entirely of crewmen were used with crew leaders placed behind to supervise and become mop-up men. Each crewman was assigned to what was considered the maximum width of interval without impairing the efficiency of the work. This was a width of 16 feet compared to a width of 12 feet by the old formation. Each formation, the old and the new, was covering an over-all width of 144 feet. In the old formation 12 men covered this area and in the new formation 9 men covered the area.

In justifying the new formation of placing the crew leaders behind their crews to supervise and become mop-up men the following advantages were anticipated: (1) Because original ribes patterns have been found to persist into second and third workings, crew leaders would be assisted by crews locating these ribes patches enabling them to concentrate searching primarily to areas known to have ribes. This was proposed because crewmen often fail to see or

to pull one ribes if three or four are present. (2) Supervision becomes more effective with the crew leader behind his men. Crewmen assume more responsibility since the crew leader has direct contact with individual standards of work, and they assume an individualistic attitude toward the job of ribes eradication since they are immediately responsible for the standard of work to the assistant camp boss who is right behind them. The latter is supervising and checking the work of all crews in the gang formation.

The results of these two comparative gang formation studies are shown in table 3.

TABLE 3

SUMMARY OF PLOT DATA FOR THE 4 THREE-MAN GANG FORMATION OF CREWS
AND FOR THE 3 FOUR-MAN GANG FORMATION OF CREWS WORKING
IN CUTOVER TYPE ON THE CLEARWATER OPERATION

Type of Crew Gang Forma- tion	No. of Sub- blocks	Eradication Values Per Acre									
		Crews		Crew Leaders		Assistant Camp Boss		(1) Check		Total Ribes	Total Man- Days
		Ribes Pulled	Man- Days	Ribes Pulled	Man- Days	Ribes Pulled	Man- Days	No. Ribes	Feet Live Stem		
Four 3-Man Crews	14	61.27	.762			8.58	.068	31.95	36.21	101.80	.830
Three 4-Man Crews	15	54.19	.556	9.91	.195	3.00	.067	19.88	15.60	86.98	.818

(1) Values on 8 per cent actual field check calculated to 100 per cent.

The 4 three-man gang formation of crews pulled an average of 61.27 ribes per acre at a cost of .762 man-days. This represented a cost of 5.97 minutes of searching and pulling time chargeable against each ribes removed by the crews. Of the total number of ribes present the crews removed 60.19 per cent of the bushes. The 3 four-man gang formation of crews pulled an average of 54.19 ribes per acre at a cost of .556 man-days. This represented a cost of 4.92 minutes of searching and pulling time for each ribes removed. Crews under this formation accounted for 62.30 per cent of the total ribes on the area. Crew leaders behind the crews in the latter formation recovered an average of 9.91 ribes per acre at a cost of .195 man-days. Crews and crew leaders together obtained an average of 64.10 ribes per acre at a cost of .751 man-days. This raised the cost of each ribes removed from 4.92 minutes per bush to 5.62 minutes, but in the meantime the per cent of total ribes removed was raised from 62.30 per cent to 73.70 per cent at only a cost of .70 minutes per bush removed.

The assistant camp boss behind the 4 three-man gang of crews recovered 8.58 ribes per acre at a cost of .068 man-days. He was thus able to increase the efficiency of the eradication work by 8.43 per cent of the total ribes present. The assistant camp boss behind the 3 four-man gang formation of crews removed an average of 3.00 ribes per acre at a cost of .067 man-days. He was able to increase the efficiency of the eradication work by 3.45 per cent of the total ribes population present. In the end this new formation of crews left an average of 19.88 ribes with 15.60 feet of live stem at a cost of .818 man-days per acre. The 4 three-man gang formation of crews left an average of 31.95 ribes with 36.21 feet of live stem at a cost of .830 man-days per acre. The new formation of 4 three-man crews was thus able to accomplish a significantly higher standard of work at no increase in costs to the method of employing only the assistant camp boss back of the gang formation of crews. The differences in efficiencies between methods should be noticeably increased on working areas having less than 50 ribes bushes per acre. The efficiency of the new method increases as ribes populations become lighter, whereas, the reverse relation is usually true with the work of the old method.

B. Effects of Grazing on Ribes and Western White Pine Regeneration

Effects of Grazing Recent Cutover Lands on the Germination, Growth and Development of Ribes and Western White Pine Seedlings

Previous reports on this study have been made on page 138 of the 1939 annual report, pages 126 to 128 of the 1940 annual report and pages 126 to 131 of the 1941 annual report. Data presented in table 4 are summaries of five individual plots established to determine the effects of grazing sheep on recent cutover lands. Three of these plots are located in the Clearwater Forest and the remaining two on the St. Joe Forest.

TABLE 4

STATUS OF RIBES AND WHITE PINE SEEDLINGS IN 1942 AFTER FOUR YEARS' GRAZING ON PLOTS 1 AND 2 AND THREE YEARS' GRAZING ON PLOTS 3, 4 AND 5

Type of Plot	Status of Plant	Number Pine by Year of Origin						Number Ribes by Year of Origin					
		1938	1939	1940	1941	1942	To-tal	1938	1939	1940	1941	1942	To-tal
Plot 1 - Clearwater Forest													
Exclosure (Ungrazed)	Alive	127	94	28	5	5	259	32	30	9	1	0	72
	Dead	10	11	1	0	1	23	3	8	1	1	0	13
Control (Grazed)	Alive	109	79	20	2	4	214	54	30	4	0	0	88
	Dead	19	16	1	1	1	38	5	1	0	0	0	6
Plot 2 - Clearwater Forest													
Exclosure (Ungrazed)	Alive	32	29	4	0	4	69	23	11	1	2	0	37
	Dead	2	6	0	2	0	10	7	2	0	0	0	9
Control (Grazed)	Alive	24	31	9	2	8	74	12	0	0	0	0	12
	Dead	5	4	2	3	0	14	1	0	0	0	0	1
Plot 3 - Clearwater Forest													
Exclosure (Ungrazed)	Alive	378	340	30	6	12	766	35	42	4	4	0	85
	Dead	55	69	14	3	0	141	2	6	0	0	0	8
Control (Grazed)	Alive	273	68	16	5	10	372	139	31	4	4	0	178
	Dead	58	20	5	3	0	86	11	7	0	1	0	19
Plot 4 - St. Joe National Forest													
Exclosure (Ungrazed)	Alive	4	5	2	1	1	13	181	96	21	7	5	310
	Dead	1	0	0	0	1	2	7	3	1	1	1	13
Control (Grazed)	Alive	4	4	1	2	1	12	123	63	10	3	4	203
	Dead	1	0	0	0	0	1	62	37	9	11	3	122
Plot 5 - St. Joe National Forest													
Exclosure (Ungrazed)	Alive	6	8	1	3	15	33	36	14	3	1	1	55
	Dead	0	2	0	0	1	3	1	1	0	0	0	2
Control (Grazed)	Alive	7	12	4	3	13	39	74	13	1	0	1	89
	Dead	1	2	0	0	0	3	26	11	1	0	0	38

Plot 1, located on an east exposure, has shown no significant difference in the amount of germination and seedling survival of ribes and white pine between the ungrazed and grazed areas of the plot. Plot 2 on a west exposure has shown a tendency for ribes to continue germination on the ungrazed portion of the plot long after germination had ceased on the grazed area. It is difficult this early in the study to determine whether grazing has or has not been largely responsible for the continued germination of ribes seed. Since the year 1940, germination of pine seed appears to have been slightly favored on area being grazed. Plot 3, which represents a condition of general exposure, has not shown any material difference in germination of ribes and white pine seedlings between the ungrazed and grazed portions of the plot.

In the St. Joe Forest, on plots 4 and 5, germination of ribes and white pine seedlings has been very comparable on both the grazed and ungrazed portions of the plots. There has been, however, a noticeable loss of ribes seedlings

from the action of trampling and browsing by sheep on plot 4. Nearly all this loss has occurred when ribes were less than four years of age. Of the 325 ribes germinating on the plot, 122 or about 38 per cent has been eliminated by the action of sheep. No loss of white pine seedlings from sheep has occurred on either of the two plot areas grazed.

Effects of Deferred Grazing on the Germination, Growth and Development of Ribes and Western White Pine Seedlings

Previous reports on this study have been made on pages 128 to 129 of the 1940 annual report and on pages 133 to 135 of the 1941 annual report. Data presented in table 5 are summaries for plot 6 located on a northern aspect and for plot 7 located on a southern exposure in the Clearwater Forest. Cutover lands representing these studies were grazed for a period of about five years before the exclosures were established. The problem in question is whether or not adequate control standards of eradication work can best be obtained with or without sheep on these areas.

TABLE 5

STATUS OF RIBES AND WHITE PINE SEEDLINGS AFTER THREE YEARS' MIDSUMMER GRAZING ON CUTOVER LANDS IN THE CLEARWATER FOREST (PLOT 6, NORTH EXPOSURE; PLOT 7, SOUTH EXPOSURE)

Type of Plot	Status of Plant	Number Pine by Year of Origin						Number Ribes by Year of Origin					
		1935- 1938	1939	1940	1941	1942	To- tal	1935- 1938	1939	1940	1941	1942	To- tal
Plot 6 - Clearwater Forest													
Exclosure (Ungrazed)	Alive	106	40	26	18	2	192	23	17	24	19	2	85
	Dead	74	4	8	4	0	90	8	9	6	3	0	26
Control (Grazed)	Alive	154	26	36	28	11	255	25	7	2	4	0	38
	Dead	44	4	3	11	0	62	3	2	1	1	0	7
Plot 7 - Clearwater Forest													
Exclosure (Ungrazed)	Alive	371	76	30	13	4	494	31	6	2	4	0	43
	Dead	71	12	8	5	0	96	8	2	0	0	0	10
Control (Grazed)	Alive	365	46	23	20	9	563	27	5	4	3	0	39
	Dead	64	11	12	10	0	97	9	1	2	0	0	12

On plot 6 ribes germination has been more pronounced on the ungrazed area and pine germination more pronounced on the area permitted to be grazed. No appreciable difference has been found in the germination of ribes and pine seed on plot 7 between the ungrazed and grazed portions of the plot. It will be necessary for these studies to continue over quite a period of time before definite trends in ribes and pine seed germination can be specifically determined. The results of these studies so far indicate, however, that the germination of ribes seed does not appear to be associated with the disturbance caused by the trampling of sheep over cutover lands. Any disturbance such as that caused by sheep which takes place on areas year after year will probably be found favorable to the germination of white pine seed and at least nonencouraging to the germination of ribes seed. From the time

enclosures of plots 6 and 7 were established, pine seedlings have been appearing in greater numbers on the grazed than on the ungrazed or protected areas.

Vegetative densities, plant heights and many other morphological studies are being made of all plants associated with and including ribes and pine on these plots. This is being done because it has been the general belief of many that sheeping was responsible for large numbers of dwarfed ribes bushes on grazed cutover lands. These studies have shown, so far, that the amount of live stem produced and the height of bush is governed by exposure, favorableness of growing season and by the type or composition of soil on which the plant is growing. Grazing has been found to have little or no effect upon the morphological development of ribes bushes except in cases of severe overgrazing. Keeping sheep off an area will not necessarily improve the visibility for ribes because they will shortly become screened by the response of the major forage population. Ribes are only a poor secondary browse plant under normal rates of grazing, consequently any deferment of sheep from these cutover lands will stimulate more the development of the palatable group than the unpalatable class of plants. No advantage is seen for the deferment of grazing in establishing blister rust control measures to these cutover lands. Control work should, however, always be done in advance of each season's grazing on an area to avoid the possibility of having to look for partially defoliated ribes.

Effects of Controlled Grazing on the Germination, Growth and Development of Ribes and Western White Pine Seedlings

Previous reports have been made on this study on pages 128 to 129 of the 1940 annual report and on pages 131 to 133 of the 1941 annual report. This study is being carried on in cooperation with the School of Forestry, University of Idaho and the Clearwater Timber Protective Association. The Bureau has agreed to follow the ecological history of ribes regeneration on the areas under observation. The results of four years' study are shown in table 6. Fifty head of sheep were grazed on section A for three days and on section C for two days. This is at the rate of 14 acres per animal unit for section A and 21 acres per animal unit for section C. Section B remains ungrazed.

TABLE 6

STATUS OF RIBES SEEDLINGS IN 1942 AFTER FOUR YEARS OF CONTROLLED GRAZING ON CUTOVER LANDS IN THE CLEARWATER FOREST

Type of Plot	Status of Bush	Number of ribes by Year of Origin					
		1935- 1938	1939	1940	1941	1942	Total
Section A Grazed 3 days	Alive	8	3	0	0	0	11
	Dead	6	1	0	0	0	7
Section B Ungrazed	Alive	11	0	0	0	0	11
	Dead	2	0	0	0	0	2
Section C Grazed 2 days	Alive	14	0	1	0	0	15
	Dead	1	0	0	0	0	1

Section A and also section C have shown but slight ribes regeneration response to the different intensities of grazing. The origination of these new seedlings may or may not have been caused by the disturbance of sheeping. Four new ribes originated on section A the same year the enclosure was established. The one new bush on section C came in the second season. Since 1940 no additional ribes regeneration has taken place on either of the two grazed areas. The ecological history of ribes regeneration on these plots will be followed over a number of years in order to accurately determine what effects different degrees of grazing have on the occurrence and development of ribes.

Morphological development studies of ribes on these plots have shown considerable differences between bushes grazed and ungrazed. On section A (grazed three days) the average ribes height was found to be 1.05 feet; average feet of live stem, 3.02 feet; number of leaves before grazing, 30.09; and number of leaves following grazing, 23.64. The sheep removed or browsed 21.4 per cent of the total leaves present. On section C (grazed two days) the average ribes height was observed to be 1.10 feet; average footage of live stem, 3.87 feet; number of leaves before grazing, 29.93; and number of bushes after grazing, 24.67; the sheep having removed only 17.6 per cent of the total number of leaves present. On section B, the ungrazed portion of the plot, the average height of ribes was found to be 1.34 feet; average feet of live stem, 6.81; and number of leaves per bush, 67.27. On this latter section, feet of live stem and number of leaves were about double those per bush on the grazed sections. Heights of bushes in all three sections are about the same. The intensities of grazing have had little influence so far in the development of ribes, although ribes on the more heavily grazed area show a slight decrease in heights, feet of live stem and total number of leaves. Ribes on the ungrazed section must be considered more hazardous because of the larger blister rust target made by the more abundant crop of leaves. As far as finding ribes on these three sections, those on the grazed sections are most visible. Ribes on the ungrazed section are badly screened by the more prolific growth of plants such as ferns, thimbleberry, huckleberry, grasses and various annuals and biennials that are responding most from the nonuse of range land.

Effects of Continued Seasonal Grazing of Old Logged and Burned-Over Lands on the Regeneration of Ribes and Western White Pine Seedlings

Early logging practices on much of the St. Joe Forest represented conditions of clear-cutting all merchantable white pine trees and disposing of slash by broadcast burning. This practice fairly gutted large acreages that didn't appear to have a chance of becoming restocked with any forest species let alone white pine. In most instances, there was no source of white pine seed within miles of some of these areas. Through some twenty to thirty years, however, white pine reproduction has become miraculously established until today many of these areas are approaching a condition of satisfactory stocking. Holes still remaining in the stands are gradually becoming filled with reproduction originating from seed produced by trees fifteen to twenty-five years old. These became established shortly after the fires. Nearly all these areas have been continually grazed since the first year or so following

the heavy burning of these cutover lands. Medium to heavy populations of ribes were encountered on most of these areas in the initial application of control measures. Most of these bushes had produced fruit for years up until their removal so that much new seed is in the ground. The question that has always been in the minds of those responsible for the protection of these areas is just what effects this continual grazing has on the regeneration of ribes and white pine seedlings.

In order to answer this question, three grazing exclosures were established in 1940 on the Marble Creek drainage in the St. Joe Forest. Each exclosure has an equal area of grazed ground which is used as the control unit. All ribes bushes established prior to the construction of the exclosures have been removed. All pine and other coniferous species of trees have been recorded and plotted on maps for ecological study of succession. Since 1940 these plots have been examined each season for new ribes and white pine seedlings. Over this three-year period no new ribes have been found. New pine seedlings are, however, commencing to appear quite generally over both the ungrazed and grazed portions of these studies. These new seedlings are originating from seed produced by reproduction just commencing to bear cones. Since the exclosures have been exposed to many years of grazing before the establishment of these plots, it will probably be from three to five years yet before the grazing scars heal, enabling a comparison to be made of pine regeneration between grazed and ungrazed portions of this study. Major palatable plants within the exclosures are just commencing to respond to protection from grazing. These studies will be followed each year over a long period of time in order to obtain the ecological history of ribes required for effective control work on these areas and information on the regeneration of white pine essential to the development of satisfactory forest management plans by the Forest Service.

C. Ecology Studies of Ribes and Western White Pine Regeneration

The Effects of Variable Light and Moisture Conditions on the Germination, Growth and Development of *R. viscosissimum*, *R. lacustre* and *P. monticola*

Previous reports on this study are shown on pages 122 to 126 of the 1940 annual report and on pages 119 to 126 of the 1941 annual report. This study was established to specifically determine the conditions affecting germination, survival and growth of the two major species of ribes found in this region and of western white pine under full sun, half shade and full shade light intensities. At each light station seed was sown on natural duff, mineral and burned-mineral soil surfaces. During the first year plots were inspected at ten-day intervals throughout the season. During the second season plots were examined at approximate monthly intervals. The total number of ribes and white pine seed germinating during each of the seasons, 1941 and 1942, are shown in table 7.

TABLE 7

OCURRENCE OF RIBES AND WHITE PINE SEEDLINGS FOR THE YEARS 1941 AND 1942 OF 16,000 RIBES AND 2,000 SEEDS OF PINE SOWN ON DUFF, MINERAL AND BURNED-MINERAL SOIL SURFACES UNDER FULL SUN, HALF SHADE AND FULL SHADE LIGHT CONDITIONS

Year of Germination	Duff Surface			Mineral Surface			Burned-Mineral Surface		
	R. lac.	R. vis.	P. mont.	R. lac.	R. vis.	P. mont.	R. lac.	R. vis.	P. mont.
Full Sun Light Station									
1941	15	16	20	3,184	1,322	883	1,966	740	314
1942	674	2	6	2,134	7	14	5,967	13	1
Total	689	18	26	5,318	1,329	897	7,933	753	315
Half Shade Light Station									
1941	42	54	49	2,725	1,092	1,170	2,650	1,556	1,200
1942	1,348	1	90	6,078	11	29	8,493	19	39
Total	1,390	55	139	8,803	1,103	1,199	11,143	1,575	1,239
Full Shade Light Station									
1941	771	288	841	1,937	1,083	1,434	2,233	1,554	1,379
1942	5,968	0	212	6,191	0	44	6,326	0	49
Total	6,739	288	1,053	8,128	1,083	1,478	8,559	1,554	1,428

In the above table the actual number of seeds germinating during the years 1941 and 1942 is shown by species on the three soil surfaces under the different intensities of light. A total of 16,000 ribes seed and 2,000 pine seed was sown on each of the soil surfaces at the three light stations. Of the total number of R. lacustre seed germinating at the full sun station about 98 per cent on duff, 40 per cent on mineral and 75 per cent on burned-mineral surfaces took place the second season. The bulk of R. viscosissimum and white pine seed germinated the first season. The burned-mineral surface was the most favorable medium for the germination of R. lacustre seed and the mineral surface for R. viscosissimum and white pine seed.

Of the total number of R. lacustre seed germinating in two seasons at the half shade station about 97 per cent germinated on duff, 69 per cent on mineral and 76 per cent on burned-mineral soil surfaces during the second season. Of the total number of R. lacustre seed germinating at this station the larger number occurred on the burned-mineral surface followed in order by mineral and duff. With the exception of pine seed on duff surface, the bulk of R. viscosissimum and pine seed germinated during the first season. The total number of R. viscosissimum and pine seed germinating on the three soil surfaces under the three intensities of light has been generally heavier under conditions of full shade. Increased soil moisture and reduced soil temperature have been factors primarily responsible for increased germination of seed toward conditions of full shade.

Of the total number of R. lacustre seed germinating by soil surfaces in two seasons at the full shade station about 89 per cent germinated on duff, 76 per cent on mineral and 74 per cent on burned-mineral soil surfaces during the second season. The larger number of R. lacustre seed germinating at this station occurred on the burned-mineral surface as was the case at the half shade and full sun stations. It is interesting to note that no germination of R. viscosissimum seed took place during the second season at this station. Of the total number of all seeds germinating, the increase has been from full sun toward conditions of increased moisture and a lowering of soil temperatures that prevail at the part and full shade stations.

From the results shown in table 7 of germination on duff, mineral and burned-mineral soil surfaces under full sun, half shade and full shade conditions, the following conclusions can be reasonably drawn after two years' study: (1) The peak of germination for fresh sown seed of R. lacustre occurs the second season; that for R. viscosissimum, the first season. (2) The peak of germination for western white pine seed occurs, with possibly the rare exception of good storage conditions, the first season. (3) The number of all seeds germinating for both ribes and white pine increases generally toward conditions of increasing soil moisture and a lowering of soil temperature under reduced light intensities.

The question is often asked, "How many of the ribes seed germinating become established as seedlings under the various forest conditions?" This can be answered, in part, from the results shown in table 8.

TABLE 8

TOTAL NUMBER OF RIBES AND WHITE PINE SEED GERMINATING THE
FIRST SEASON AND PER CENT OF THESE SEEDLINGS SURVIVING
OCTOBER, 1941, JUNE, 1942, AND OCTOBER, 1942

No. Seedlings Germinating First Season and No. Surviving by Dates	Luff Surface			Mineral Surface			Burned-Mineral Surface		
	R. lac.	R. vis.	P. mont.	R. lac.	R. vis.	P. mont.	R. lac.	R. vis.	P. mont.
Full Sun Light Station									
No. Seeds Germinated	15	16	20	3,184	1,322	883	1,966	740	314
% Survival - Oct. 1941	60.0	81.2	70.0	77.8	92.3	63.8	59.2	86.6	65.9
% Survival - June 1942	53.3	68.7	70.0	66.4	43.3	63.2	46.6	69.6	65.3
% Survival - Oct. 1942	53.3	68.7	70.0	66.2	43.0	62.7	45.6	69.1	65.3
Half Shade Light Station									
No. Seeds Germinated	42	54	49	2,725	1,092	1,170	2,650	1,556	1,200
% Survival - Oct. 1941	76.2	81.5	75.5	97.2	92.4	93.9	95.0	92.0	85.0
% Survival - June 1942	52.4	16.7	69.4	81.5	44.1	90.9	70.5	56.3	78.2
% Survival - Oct. 1942	52.4	14.8	69.4	81.3	43.3	90.8	70.0	55.7	77.9
Full Shade Light Station									
No. Seeds Germinated	771	288	841	1,937	1,083	1,434	2,233	1,554	1,379
% Survival - Oct. 1941	89.1	85.8	79.2	89.5	84.9	82.2	95.8	88.4	77.9
% Survival - June 1942	52.4	7.6	75.4	40.4	7.4	79.8	17.5	0	74.0
% Survival - Oct. 1942	47.6	5.9	74.6	40.0	5.5	79.6	17.3	0	73.8

The subheading, "Number Seeds Germinated," is the actual number of first-year ribes and white pine seedlings recorded the first season. The per cent survival of these germinated seedlings is shown as of October, 1941, June, 1942, and October, 1942. Survival of seedlings that germinated the second season is not considered in this table. Causes of seedling mortality from date of seed germination to October, 1941, were classified as losses from physical, insect, damping-off fungi, heat and drought. Cause of mortality from October, 1941, to June, 1942, was classified as winter kill. Causes of mortality from June, 1942, to October, 1942, were the same as shown for the dates corresponding to period between seed germination and October, 1941.

At the full sun station the per cent survival of R. lacustre seedlings was generally lower than for R. viscosissimum. Mortality from winter kill was heavy for ribes; there was little change in the status of pine during this period. At the half shade and full shade stations mortality of R. viscosissimum seedlings was extremely heavy, especially during the winter months. Damping-off fungi appeared to be largely responsible for heavy mortality of seedlings during the winter months. Winter kill of ribes is observed to generally increase toward lowering light intensities, a condition which causes reduced vigor of ribes. The percentage of white pine seedlings surviving over a period of two growing seasons appears to be little influenced by either the intensity of light or the type of soil surface. The difference in tolerance to shade is clearly shown in table 8, by differences in the per cent of R. lacustre and R. viscosissimum seedlings surviving at the three stations; R. lacustre is far more tolerant than R. viscosissimum but less tolerant to shade during the first two growing seasons than white pine.

TABLE 9

pH MEASUREMENTS OF SOIL SAMPLES TAKEN FROM
LIGHT-MOISTURE PLOTS, LIGHT CONDITIONS
AND SOIL SURFACES AS SHOWN

Soil Zone	pH of Soil Sample								
	Duff Surface			Mineral Surface			Burned Mineral Surface		
	1940	1941	1942	1940	1941	1942	1940	1941	1942
Full Sun Station									
Surface	5.04	5.33	5.30	5.99	6.18	6.10	7.49	7.16	7.29
6-inch	5.57	5.84	5.71	5.67	6.01	5.97	5.59	6.26	5.90
12-inch	5.79	5.75	6.10	5.92	5.92	5.89	6.62	6.18	6.18
Half Shade Station									
Surface	5.29	5.27	5.09	5.79	5.84	6.18	7.22	6.95	6.60
6-inch	6.01	6.35	6.31	5.97	6.26	6.10	6.05	6.24	6.18
12-inch	5.90	6.01	6.01	5.72	5.93	5.84	5.92	5.96	5.90
Full Shade Station									
Surface	5.36	5.17	5.58	6.01	6.01	6.18	7.20	7.20	7.28
6-inch	5.92	5.90	5.75	5.88	6.01	5.84	5.58	5.82	6.18
12-inch	5.90	5.67	5.84	5.63	5.67	6.01	5.92	5.84	5.88

Hydrogen-ion determinations are shown for the three light stations by type and depth of soil surface in table 9. The three soil zones for the duff plots at the three light stations have shown but slight pH variations over three years' study. The removal of duff off mineral soil has slightly reduced the acidity of the latter. Alkalinity of burned-mineral surface soils has been reduced by leaching over the past three years. Less change in hydrogen-ion concentration has taken place under conditions of full shade where moisture and temperature remain fairly constant.

Resprouting Habits of *R. lacustre*

This study was undertaken to determine the size and portion of *R. lacustre* roots capable of asexual development. The problem also involved the effects of exposure and season of year on potential resprouting habits of this species. Three root treatments were employed, namely: (1) Roots were severed at the crown leaving a portion of crown tissue attached to the root. (2) Roots were cut about one-half to one inch below the crown, not paying any attention to whether crown tissue was present or not. (3) Roots were severed at least six inches below the crown to be sure no crown tissue was present. The first treatment was employed to encourage resprouting; the second treatment was used to make resprouting questionable, and the third treatment was employed to insure no resprouting and illustrate to the field operations the size and portion of *R. lacustre* root that can be left without asexual comeback of bushes. These three treatments were established on a north and south exposure during the spring, summer and fall growing seasons. The site selected for this study is located on Scaler Creek in the St. Joe National Forest.

Ribes selected for study of resprouting habits on the Scaler Creek drainage were from four to six years of age. A forester's pruning shear and a pair of small hand shears were the implements used in cutting the roots. *Ribes* on the north exposure had long, trailing, and few stems; large, thin, and few leaves; and roots somewhat shallow in comparison to those on the south exposure. Those on the south exposure had rather short, stout, and many stems; somewhat small, thick, and many leaves; and deep, penetrating roots. *Ribes* on both exposures were under some shade since the area was partially logged.

Final results of these treatments will not be available until the latter part of the 1943 season. This delay is necessary because of the fall treatment of roots and to provide sufficient time for delayed resprouting of all treatments. An inspection was made, however, of the spring and summer series during the past fall season. The general trends found during this inspection were as follows: (1) Asexual development or resprouting was restricted entirely to roots with crown tissue. (2) Resprouting of roots with crown tissue was much greater in number of total roots treated on the south exposure. (3) Resprouting of roots with crown tissue was much greater for the summer than for the spring-treated series. That resprouting would be restricted to roots with crown tissue seemed apparent from field observation before the present study was established. The fact that the greater number of roots with crown tissue resprouted on the south exposure and for the summer treated series may seem contrary to previous experience of most blister rust personnel.

The explanation for the greater amount of resprouting on the south exposure appears to be a longer and a much earlier growing season for the production of reserve food. Also, with the greater intensity of light more food can be manufactured, say in an hour, than could be produced by bushes on a north slope under lower light intensities. High soil temperatures, depth of root penetration, sturdy roots and plant associations are other factors that might be instrumental in conditioning greater resprouting. As previously mentioned, bushes on the north exposure have large, thin, and few leaves in comparison to those growing on south exposures. These facts lead one to believe that such bushes are not capable of manufacturing large reserves of food for storage which is apparently one of the prime prerequisites along with moisture for asexual development. With more roots having crown tissue resprouting from the summer series than from the spring-treated series it appears that this difference was caused primarily by the longer growing season for the manufacturing of food by bushes allowed to grow until midseason. Other factors, such as higher soil temperatures in midseason are also important.

The results of these studies, although not complete, show significant trends which will aid at this time in the formulation of satisfactory control methods for R. lacustre. The following points are suggested: (1) Since resprouting is restricted to roots with crown tissue, all roots should be removed at least six inches in all directions from the root crown. (2) All aerial plant parts such as layering stem, buried stem, stolons, small pieces of broken stem, etc., should be removed from the ground and placed on some object to dry. (3) Early season eradication of R. lacustre when conditions favor ease of removing bushes and ribes are less liable to sprout will result in a more satisfactory job of eliminating roots capable of resprouting. (4) Closer supervision of workmen should be provided in the job of removing R. lacustre roots on southern exposures. It is on such sites where the greater amount of resprouting from roots with crown tissue will take place.

Ribes Regeneration Key for the Western White Pine Region

This key was formulated in 1941 from a basic ecology weight-rating plan instituted in the California region. Its purpose is to develop an ultimate method of judging the potential ribes seedling contingency on areas being given protection by systematizing all ecological knowledge which may influence or indicate conditions for ribes seedling survival. This key will serve two important purposes: (1) It will provide a form on which the seedling contingency can be worked out for any given area by those personnel considered as nonspecialist in ecology, and more important, (2) It will bring together in the minds of all personnel the many ecological factors and their respective importance which influence or indicate conditions for ribes seedling survival. It is hoped that this deductive reasoning from general ecological facts to the particular ribes seedling contingency of areas can become an everyday habit with permanent personnel without the use of the key form.

The basic key originally developed for the white pine region has undergone many revisions in the last two years. These are necessary in order to develop a basic plan serviceable throughout the region in all the eradication

types. This requires much type sampling on each of the operations to determine the ribes contingency associated with and influenced by factors herewith classed as ecology. The present key carries a factor rating of 200 points divided among seven classes. These classes and their respective ratings are: plant association (30), maturity of vegetation (40), density of vegetation (30), type of disturbance (40), age of disturbance (20), exposure (10), and ribes population removed (30). Numerical weights for plant association, maturity of vegetation and density of vegetation are divided equally within classes between timber and brush. Type of disturbance is divided into eradication, sheep, fire and logging. The importance and weights of these types of disturbances increase from eradication to logging. Age of disturbance throws the bulk of weight below ten years, a full 20 points being given for the ages one to three. Exposure gives north 10 points; east, 8; level topography, 6; west, 4; and south, 1.

The class, ribes population removed, has been the most difficult factor to orient, because oftentimes the ribes population taken off an area is not truly a criterion of the number of new seedlings likely to come back. In other words, an area on which 500 ribes have been removed per acre may not have a greater seedling problem than one from which only 50 ribes have been removed per acre. Successional history of ribes and potency of seed after many years storage are undoubtedly factors responsible for some of these variations. Since ribes regeneration from new seedlings in this region is not significantly important except on recent cutover lands, the assignment of weights within the class is being accomplished on a broad basis. Weights have thus been accordingly assigned as follows: 1 to 100 ribes per acre, 1-10; 101 to 500 ribes per acre, 11-20; and 500+ ribes per acre, 21-30 points. The only ribes considered in this class are those removed by first working.

The key as revised and used toward the end of the 1942 field season is proving quite satisfactory in determining the potential ribes seedling problem on areas throughout the region. The key will always have a large standard error of estimate in the determination of the exact number of ribes seedlings originating on an area after eradication. The key will be found, however, very accurate in determining the likelihood of conditions for seedling survival on an area. This is, of course, a more important point than knowing how many ribes seed are going to germinate. Further work is planned in testing the application of this key to various eradication types in the region before sufficient information can be secured for completion of the method.

Slash Disposal Measures and Their Effects Upon Ribes and Western White Pine Regeneration

Slash disposal measures in the western white pine type have not been entirely satisfactory in the past. For one thing, costs have been considered high. In addition, loss of many valuable residual trees near burned slash piles has resulted in reducing volume for next cutting and number of seed trees for the source of natural regeneration. Thus, white pine stocking is often inadequate and ribes regeneration on these areas is usually quite heavy

because of burning. In 1939, the Forest Service, State Forester of Idaho, School of Forestry of the University of Idaho, Potlatch Forests, Incorporated, and the Bureau of Entomology and Plant Quarantine worked with a slash disposal committee sanctioned by the Inland Empire Section of the Society of American Foresters in planning and establishing experimental studies on new slash disposal measures for the region. The Potlatch Forests, Incorporated, undertook the field studies on the Clearwater and St. Joe Forests. The Bureau was asked to study the ecological history of ribes regeneration along with white pine reproduction.

The general method of slash disposal proposed by the committee, and instituted in the field by Potlatch Forests, was the piling and burning of slash along right of ways, along ridges, and from one ridge to another, in order to break up the body of slash into small units of about five acres each. In other words, fire lanes or breaks were made between one to two chains wide along hazardous spots throughout the area, so that no body of slash was much over five acres in extent. If fire ever got started on the area it was reasoned that the many fire lanes would afford an opportunity to combat the fire without much difficulty, since the fire lanes were carefully cleaned of all slash fuel. Slash that remained in the small five-acre units was broken up quite finely since caterpillars were used to log the areas. It is expected that this fine slash will decompose rapidly in comparison to bulky slash left after horse logging. Rapid decomposition of this fine, pulverized slash should materially reduce the period of high fire hazard by a number of years on such areas.

An inspection of two slash-treated areas in the Clearwater Forest last season showed some interesting facts. It has been two years now since these areas were logged. Information on the regeneration of ribes and pine seedlings was obtained by running a 20 per cent check, a check strip 13.2 feet wide at intervals of one chain over the area. The occurrence of ribes seedlings on these areas has been less than five per acre. These few have been found around the edges of burned slash piles and along main skid trails. None have been found on the small areas still containing slash. These few ribes per acre present an entirely different picture than was found on an adjacent area on which all slash was piled and burned. On the latter area ribes seedlings were appearing in numbers of about 80 bushes per acre and scattered generally throughout the area.

The regeneration of pine seedlings on the experimental areas of slash disposal is numbering better than 500 per acre. These are scattered generally over the entire area, thus assuring satisfactory stocking. Of particular interest is the fact that these pine seedlings are germinating as well in the slash areas as in the fire lanes. The germination of pine seedlings on the adjacent area, where all slash was piled and burned, has been at the rate of less than 100 per acre. One of the main reasons why there are not more is because so many seed trees were damaged or destroyed by fire resulting from large-scale slash disposal.

Studies of the new method of limited or partial slash disposal have shown thus far the encouraging results as follows: (1) cheaper costs of slash disposal, (2) negligible loss of residual volume or seed trees with careful piling and burning methods employed, (3) good fire protection and suppression measures established on the areas (4) few ribes seedlings germinating (searching for these few ribes can be restricted almost entirely to skid trails and fire lanes) and (5) excellent regeneration of white pine seedlings scattered generally over the entire area, thus assuring good stocking.

III. LABORATORY AND GREENHOUSE WORK

Laboratory and greenhouse studies relating to the improvement of control methods were in progress at Berkeley throughout the calendar year of 1942. Greenhouse facilities for our work are now provided at the Albany Gill Tract of the University of California. Early in November, 1941, all equipment and plant material were moved from greenhouse No. 6 on the campus to the Gill Tract. These new quarters provide many improved facilities, though the present curtailment of auto travel makes the new greenhouse location more inconvenient than was anticipated. Also, continuous care of the greenhouse has had to be provided by the permanent Berkeley staff since January, 1942, when cessation of the WPA project deprived us of a greenhouse assistant. The following summary gives the scope and objectives of the more important laboratory and greenhouse assignments for 1942.

Soils Work

The development of the ribes regeneration key in California and Idaho emphasized the need for more data on soils, especially in California, where considerable variations in soil types occur. Twenty-eight California soil samples collected in 1938 were tested for moisture equivalent (by high-speed centrifuge) and permanent wilting percentage (by standard sunflower test). Data for available water were calculated but these figures must be considered as approximations because the soil density was not measured in the field at the time the soil samples were taken. A smaller number of soils, representing in a rather broad way the range or variations in soil types, with which we are commonly concerned, were analyzed for total nitrogen and organic carbon. The carbon-nitrogen ratio provides an approximation of what has been termed the "fertility level" of the soil. A new and what may be a convenient technique for determining wilting point percentage was tested for several of the soils already checked by the sunflower method. The principle of the new method is to allow tared dishes containing the soil samples to come to equilibrium with a saturated solution of barium nitrate in a desiccator, the whole system being maintained at reasonably constant room temperature. The method lends itself to testing of large numbers of soil samples and requires little or no attention once the samples have been set away. Further tests of California and Idaho soils are planned with this new method.

Correlations of the above physico-chemical soils data with germination tests and growth tests of ribes, and with data on the ribes populations and general site index previously obtained at the time of collecting the soil samples, showed that the soils having the lowest amounts of available water and the lowest "fertility level" were the poorest ribes sites.

Soils work will be continued during the winter of 1942-43 with the examination of samples collected in California during the 1942 survey. Useful soils data have been obtained in Idaho from the Kaniksu light-moisture plots. pH measurements in duplicate have now been made annually for the past three years on 27 soil samples from the Kaniksu plots. Top to root ratio and pictorial records of root development taken from these Kaniksu plots show differences occasioned by soil surface condition (i.e., mineral soil, burned mineral soil, and duff) in combination with insolation (i.e., full sun, half shade, full shade).

New Techniques Having Limited Field Use

1. Distinguishing between diseased and normal pine bark. In response to a request from Washington, a study was made of reagents which could be used to identify diseased and normal bark. On freshly cut thin sections of pine twigs, or thin strips of bark and stem cambium, standard ferric chloride (tannin test) and iodine + potassium iodide (starch test) reagents were absorbed by and showed their typical blue-black colorations much more rapidly in the diseased than in the normal bark. A combination of alpha-naphthol and concentrated sulfuric acid actually showed a color differentiation between healthy and diseased tissue but this reagent is not too convenient for field use. On the surface of pine bark the presence of an incipient canker, or the margin between diseased and healthy bark, was clarified and intensified by a few drops of xylo. A small dropping bottle with a ground glass cork is a handy container for carrying xylo in the field. This reagent should be useful on plot work or strip surveys for checking on questionable incipients.

2. Identifying underground parts of ribes capable of sprouting. Laboratory tests on ribes garden material later confirmed by extensive field tests showed that stolons, buried stem, or layering stem may be readily distinguished from true roots by examining for pith and confirming its presence by examination under a hand lens or by the so-called "pin test." Under gentle pressure of a pin or a sharp knife-point, pith feels soft and spongy. A hard, woody center is typical of a root and the soft pith indicates a stem which, of course, is capable of sprouting. If the specimen contains stem tissue its central core will stain black or dark blue with ferric chloride or iodine-potassium iodide, the same reagents used for distinguishing between diseased and healthy pine bark.

Greenhouse Tests on Growth Habits of Ribes

The effects of grazing animals and destructive rodents and insects on ribes seedlings are important in the cycle of ribes regeneration. To augment field data on this subject, a series of cutting tests were made on ribes seedlings in germination flats and in transplant flats. Tests were made with ribes seedlings at various stages in their development up to the time that the fourth leaf had developed. In some cases cotyledons were snipped off, and in others the seedlings were cut below cotyledons or at a point which would remove cotyledons plus one or more leaves. It is particularly interesting to note that ribes seedlings have considerable vigor even at the cotyledon stage (no leaves developed). Ten per cent of those which were

supposedly cut off "below cotyledons" survived and finally put out leaves. Thus some sprouting may occur following any cutting which fails to remove all potential growing points around the cotyledons. After the first two leaves had appeared, 50 per cent of the seedlings in the germination flats survived decapitation at cotyledon level. Further tests are planned for the winter of 1942-43.

In California the inevitable association of R. roezli and Ceanothus cordulatus suggested the comparison under controlled greenhouse conditions of the growth rate and vigor of R. roezli with and without C. cordulatus in immediate association. Mr. Quick noticed that the C. cordulatus carried root nodules which were suspected to have the function of fixing nitrogen. Accordingly greenhouse tests were made which included a series of seedlings of R. roezli and C. cordulatus growing alone and in association. One group of cultures were inoculated with mashed root tubercles collected in the field from snowbrush plants; a group of controls were not inoculated. In general the aerial parts of R. roezli were appreciably larger and more vigorous when grown in association with seedlings of C. cordulatus (mixed culture) than when grown alone (pure culture). The reverse was true of snowbrush seedlings. In pure cultures, the tops of snowbrush seedlings were heavier than the tops of gooseberry seedlings. In pure culture both species favored natural forest soil over autoclaved forest soil. Top root ratios for both species were higher in pure cultures than in mixed cultures. The top root ratios of snowbrush were, in general, much higher than such ratios for gooseberry seedlings. The growth of snowbrush was not dependent upon inoculation by root-tubercle organisms, that is, snowbrush seedlings grew in autoclaved uninoculated soil. The detailed data remain to be analyzed and reported.

Experimental Germination of Ribes Seeds

In terms of man-hours expended, germination of ribes seeds has been the most important greenhouse and laboratory assignment at Berkeley for the past seven years. The 1942 report on seed germination tests (see Serial No. 114) described work on 26 ribes species for which 1,017 cultures were prepared containing 69,755 seeds. Depth of planting and aeration were made the subject of additional germination tests not yet summarized and further tests on the same topics are planned for the winter of 1942-43. The effects of depth of planting and aeration were noted several years ago in preliminary tests but are now being studied more intensively because of their relation to soil properties and to degree and type of soil disturbance by fire, logging, wind-throw, erosion, and grazing. Forced aeration by continuous passage of moisture-laden air downward through the cultures did not help germination at a planting depth of one and one-half inches, but did indicate somewhat better results than watering with boiled and distilled water (lack of aeration) on shallow-planted cultures.

The following special reports have been prepared in final or preliminary draft during 1942:

Bureau MS No. 6552:

"Self-Incompatibility in Several Species of Ribes in the Western States"
..... Harold R. Offord, Clarence R. Quick,
and Virgil D. Moss

Serial No. 114:

"Experimental Germination of Ribes Seeds. Series of 1941"
..... Clarence R. Quick

Serial No. 115:

"Preliminary Report on the Use of Germinated Seed as a Method of Reforestation for Western White Pine"
..... Virgil D. Moss

Spokane Office Report:

"Ribes Eradication Methods Study for 1942"

1. St. Joe Operation
2. Clearwater Operation

..... Virgil D. Moss, with the collaboration of personnel from St. Joe and Clearwater.

PHOTOGRAPHIC AND EDUCATIONAL WORK, 1942

By

Edward L. Joy, Forester

H. Miller Cowling, Chief Scientific Aid

Although the photographic and educational work of 1942 included the usual wide variety of subjects, the scope of this activity was considerably reduced as a war economy measure. Included in the activities of this department are still and moving picture making in both monochrome and color, laboratory processing, Multilith printing, black-line printing, mimeograph reproducing and drafting. Several of these services are performed for both the Northwestern and the Sugar Pine Regions. Other agencies served included the Soil Conservation Service, the office of Pear Psylla Control and the blister rust investigations phase of the University of Idaho School of Forestry. In view of the large amount of service received, the Pear Psylla Control office pays half of the salary of H. Miller Cowling.

Educational activities which are carried on by all members of the technical staff include training programs for blister rust control crews, lectures both with and without slides, both the Eastern and Western motion pictures on blister rust, posters, pamphlets, preserved specimens of the rust, photographs and news items. The items used most extensively are the two moving pictures, both of which are color productions.

The following reports give in detail information on the year's work of these projects:

A. Photographic Section

The major objectives of this section are: (1) the maintenance of a pictorial record of control and investigative work, (2) the supplying of photographs, charts, maps, manuals, etc. for facilitating the field work and (3) the production of material for educational purposes. The amount of work performed under (1) and (2) was considerably reduced this year.

Again in 1942 the production of Multilith machine work was increased. This included forms, tables, graphs, charts, maps and photographs. Of particular note here is the fact that multicolored maps for annual report purposes were produced for both western regions. It is estimated that the production of these maps by this method saves from 80 to 90 per cent in labor and nearly this much in materials cost over the hand-coloring method. The type of work produced in this manner is to be found in various parts of this and other volumes of "Blister Rust Control Work in the Far West."

Large numbers of maps for field and report uses were made on the black-line printing machine. The office of Pear Psylla Control in particular had large requirements. Color photography was again used, but to a lesser extent than in 1941.

Throughout the year the mimeograph machine was in use for the production of a large volume of work. Operation of this machine is handled jointly by the

photographic and stenographic personnel. No work for Pear Psylla Control was done this year due to the purchase of a machine for their use.

Special mention is necessary for a piece of work done in 1942, namely, the revision of the eradication and checking manuals. For the first time these books were combined in one volume, which is in line with the change in title and assignment of the "Checking Supervisor" to "Assistant to Operation Supervisor." The closer working relationship accomplished by this change was facilitated by production of a single manual covering both phases of the work.

The summary of reproduction work by photographic and machine methods for 1942 is given in the following table:

PHOTOGRAPHIC, MULTILITH, BLACK-LINE AND MIMEOGRAPH WORK

Item	North-western Region	Sugar Pine Region	Pear Psylla Control	Other Agencies	Total
PHOTOGRAPHIC					
Lantern slides, natural color	131				131
Films, developed, field films	37				37
Copies, 5x7	2	1	58		61
8x10	34	13	16		113
Printing, 4x5 or smaller		30	36		66
5x7	1,040	20	184		1,244
8x10	41				41
9x11	814	261	184		1,259
on 5x7 film			13		13
Enlarging, 11x14 or smaller			91		91
14x17			83		83
16x20	1	59	32		92
20x24			17		17
on 5x7 film			13		13
Total Items	2,200	384	727		3,311
MULTILITH					
Copies	84	31	50	81	246
Plates made	142	61	48	102	353
Cards printed	1,000	5,850	37,900	1,750	46,500
Cards printed, reverse	1,000	5,000	37,900	1,750	45,650
Total cards	2,000	10,850	75,800	3,500	92,150
Paper printed	39,300	7,500	116,900	134,500	298,200
Paper printed, reverse	8,500	8,500	40,000	121,500	178,500
Total paper	47,800	16,000	156,900	256,000	476,700
Total Items	50,026	26,942	232,798	259,683	569,449
BLACK-LINE PRINTER					
Total maps, printed	585		3,041	258	3,884
MIMEOGRAPH					
Total paper	43,292			700	43,992
Grand Total All Items	96,103	27,326	236,566	260,641	620,636

B. Educational Section

Due to the increase in war activities the need for and the requests for educational material decreased in 1942. No changes were made in the bulletins, posters, pictures, etc. that were used except that the Eastern blister rust motion picture was added. No further changes were made in the Western blister rust motion picture.

There follows a summary of the range of use in 1942 of the material listed:

1. Bulletins, posters and specimens. About ten bulletins, one poster and preserved specimens in several forms are available for distribution to blister rust workers, schools, colleges and others interested in this work. The total of all bulletins, posters and maps distributed in 1942 was approximately 700. Only a scattered few specimens were sent out during the year.

2. Talks, slides and motion pictures. Practically all of the talks on blister rust were those of the question-and-answer type that followed the showing of one or both of the blister rust movies. Occasional use was found for lantern slide showings, and in each instance short talks followed. The 1942 record of blister rust moving picture showings, which does not include projections of the Forest Service-owned copy, is as follows:

	<u>Number Showings</u>	<u>Number People</u>
Western motion picture	37	2,668
Eastern motion picture	24	688

3. Fairs and exhibits. During 1942 only one showing under this category was made although the blister rust diorama was available to this region for the first time. This display was used during Idaho State Forestry Week as an exhibit along with others at the University of Idaho. Following this showing and for the balance of the year this display was used in the School of Forestry building.

4. General publicity. From time to time news items on the blister rust control work, the labor shortage angle and other related items appeared in papers of the region. No special or feature articles on this project were noted.



WHITE PINE BLISTER RUST CONTROL

IN THE

SUGAR PINE REGION

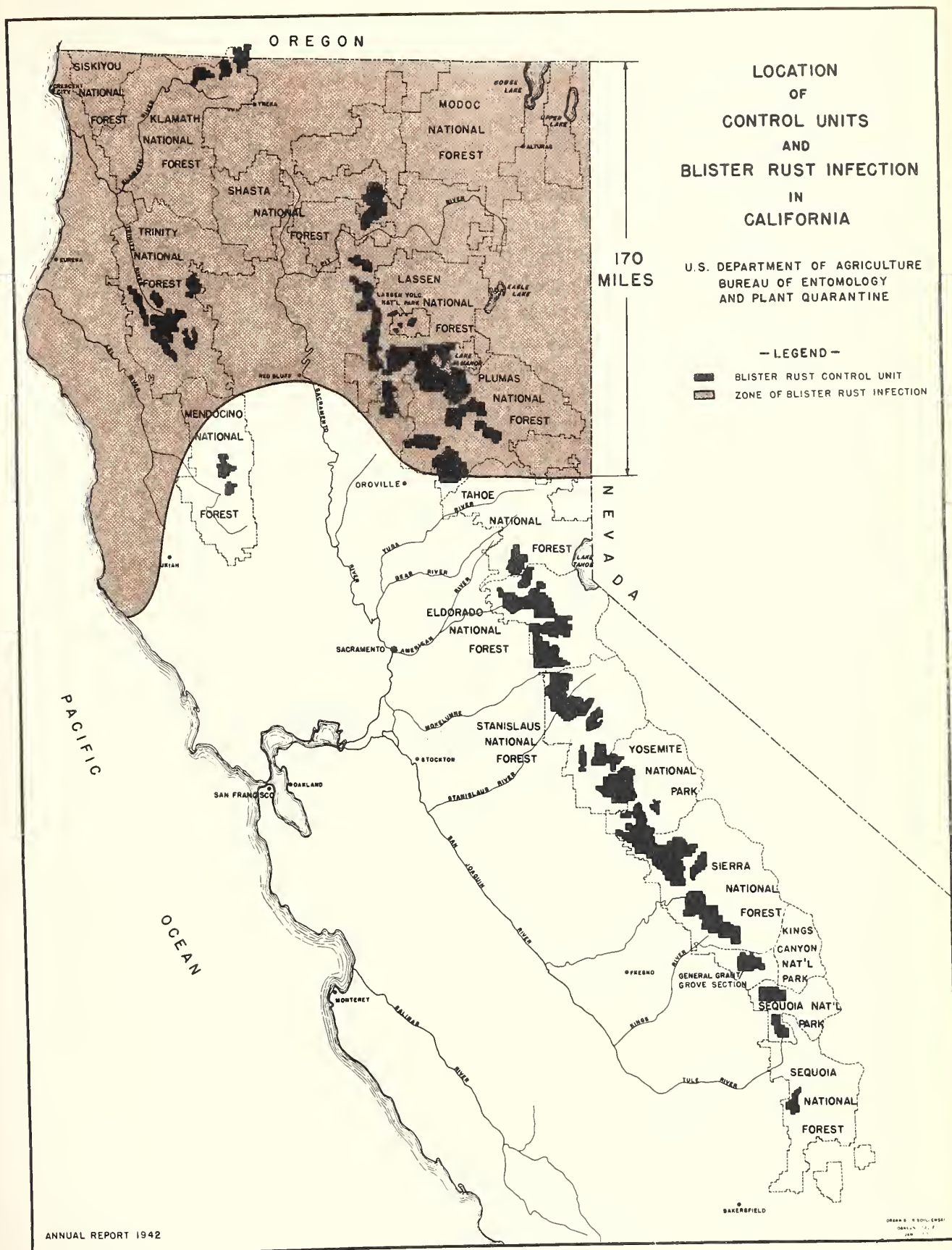
Annual Report for 1942

United States Department of Agriculture
Bureau of Entomology and Plant Quarantine
Division of Plant Disease Control
Sugar Pine Regional Office
610 Syndicate Building
Oakland, California



U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY
AND PLANT QUARANTINE

BLISTER RUST CONTROL UNIT
ZONE OF BLISTER RUST INFECTION





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ANNUAL REPORT FOR 1942

PART I

INTRODUCTIONPurpose and Plan

This report summarizes accomplishments in the control of white pine blister rust in Oregon and California during the calendar year 1942. It also summarizes the progress made in the control of blister rust in these states from 1923, when work was first undertaken, through 1942, and in so doing it assumes in part the character of a progress report. Control work was done by private, state, and federal agencies. The reporting agency is the Bureau of Entomology and Plant Quarantine* of the United States Department of Agriculture, which has been charged by Congress with responsibility for leadership, coordination, and technical direction of all control work in the United States.

Although designed primarily as an annual progress report to officials of the Bureau and of the Department of Agriculture who are ultimately responsible for the conduct of the program, the report will also be of interest to the State of California, the private firms, and the other federal agencies that participate in blister rust control work. Their needs have been recognized in preparing the text and tables.

The plan of this report differs from that of previous ones. It follows the division by the Department of Agriculture of the uniform project, white pine blister rust control, into several financial projects, which in turn are subdivided into work projects. A financial project is a phase of the uniform project for which a special subappropriation, or part of a subappropriation, is designated. For example, the Forest Service received for the fiscal year 1943 a special subappropriation for blister rust control which was set up as financial project "BLR-4 Blister rust control operations on National Forests." Similarly the Department of the Interior set up three financial projects: one for blister rust control on national parks, one for work on Oregon and California revested lands, and one for work on Indian reservations. Three financial projects under a subappropriation were established for the Bureau of Entomology and Plant Quarantine, namely: one for leadership, coordination, and technical direction of white pine blister rust control, one for blister rust quarantine enforcement, and one for cooperative blister rust control on state and privately owned lands. The unit of reporting adopted here is the financial project, or more properly in some instances, the work project, which is merely a division of the financial project into geographical areas, such as the Sugar Pine Region.

In this manner each Federal agency charged by Congress with responsibility for conducting control work on lands under its jurisdiction is allotted a major division in the report. All data, text, and tabular summaries relating to

*Hereafter in this report called the "Bureau".

work performed by that agency either in 1942 or in all previous years will be found in the major division relating to that agency. Accomplishments to which the State of California and the private lumber companies contributed as co-operators of the Bureau of Entomology and Plant Quarantine are reported in the division headed "Cooperative Control on State and Privately Owned Lands." It is hoped this new outline will enable those using the report to find readily that in which they are interested.

Summary of Accomplishments

Under the leadership, coordination, and technical direction of the Bureau of Entomology and Plant Quarantine seven public and private agencies besides the Bureau in 1942 engaged in blister rust control in California and Oregon, namely: the National Park Service, the Oregon and California Revested Lands Administration, the Forest Service, the State of California, the Red River Lumber Company, the Michigan-California Lumber Company, and the Diamond Match Company. Eight hundred and fifty men, housed in twenty two camps, were employed in Ribes eradication work from May to October in the Sierra-Nevada and Siskiyou Mountains of California and in the mountains of southern Oregon. The status of control work in the Region at the end of 1942 was:

Control areas	2,531,320 acres
Initial Ribes eradication completed on	898,590 acres
Ribes reeradication completed on	357,088 acres
Complete control established on	391,417 acres
Average per acre cost of eradication to date	\$3.38

The accomplishments of the several agencies in 1942 are given below:

Agency	Acres Worked		Number of Ribes Destroyed	Effective Man Days Expended
	Initial	Reeradication		
Cooperative Work on State and Private Lands*	7,308	12,086	1,769,413	8,854
Forest Service	13,465	12,829	3,568,577	19,386
National Park Service	13,189	346	1,293,888	10,417
O and C Revested Lands Administration	8,146	-	74,829	1,795
All Agencies	42,108	25,261	6,706,707	40,452

*By the State of California, Michigan-California Lumber Company, Red River Lumber Company, Diamond Match Company, and the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture.

The four camps (total 195 men) of the National Park Service, two in Yosemite and one in Sequoia, extended control work to new parts of the control units and reeradicated Ribes from parts previously covered. In Sequoia Park the protective work was done in the Giant Forest, and in Yosemite Park on both sides of Yosemite Valley along the Wawona Road and the new Big Oak Flat Road. The Forest Service employed 360 men in 10 camps on 5 national forests: the Rogue River, the Klamath, the Plumas, the Stanislaus, and the Sierra. Initial Ribes eradication on national forest lands is about one third completed. The Klamath National Forest concentrated on initial Ribes eradication on cut-over lands; the Plumas did the same but accomplished some Ribes reeradication in addition. The other forests spent their efforts largely on reeradication, and here and there did some initial work. The general policy during the last few years has been to confine initial eradication to cut-over lands supporting many Ribes and to those lands endangered by rust invasion or threatened invasion, and to do all reeradication as it currently falls due.

A reconnaissance party of the Oregon and California Revested Lands Administration surveyed with reference to blister rust control lands in their jurisdiction on the Siskiyou National Forest in the vicinity of Reuben Mountain, Silver Creek, Peavine Mountain, Bolan Lake, and Selma, and on the Rogue River National Forest near Fredenburg Springs. The O and C Administration maintained two camps totaling 60 men in the West Galice Unit of the Siskiyou Forest devoted exclusively to initial Ribes eradication.

Three lumber companies and the State of California cooperated with the Bureau in the control program on state and private lands in California. Six camps quartering 200 men and operating on the Lassen, Plumas, Eldorado, and Stanislaus National Forests reeradicated Ribes on areas where regeneration had occurred and did initial spot working to reduce the hazard of rust infection in certain areas on the Plumas and Lassen Forests.

In its role of leader, coordinator, and technical director the Bureau correlated the control work of the various agencies, integrated it with the regional master plan, and negotiated memoranda of understanding where necessary. The Bureau, through the assignment of operation and checking supervisors, directed the technical work of all agencies and conducted all checking activities. A force of 32 men checked 117,000 acres in the Region. Scouting for the rust disclosed no general long-distance spread of blister rust into California by aeciospores from northern sources and unfavorable conditions for rust development on Ribes in northern California generally, even in the vicinity of sporulating cankers. Several new minor infections on sugar pine were discovered and a total of 20,903 cankers were removed from 2,675 diseased pines.



PART II

LEADERSHIP, COORDINATION, AND TECHNICAL DIRECTION OF BLISTER RUST CONTROL BY THE BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Work Project BLR-1-5

By

T. H. Harris, Forester

OBJECTIVES

Under the authority of the Federal Lea Act* the Agricultural Appropriation Acts now include a subappropriation to the Bureau of Entomology and Plant Quarantine for leadership, general coordination, and technical direction of the entire control program, and for pine and disease surveys, enforcement of the blister rust quarantine, and cooperative work on State and privately-owned lands not intermingled with those Federally-owned. This section of the report will cover all the work of the Bureau having to do with leadership, coordination, and technical direction of the control program in all its phases. The objective of the project is to coordinate direction of the several parts of the main program that are being conducted by separate agencies, and to repose in one agency responsibility for general leadership of the control program.

ORGANIZATION

The regional headquarters of the Bureau of Entomology and Plant Quarantine in charge of this project, located in Oakland, California, consists of a staff of technical men and a staff of clerical, fiscal, and warehouse personnel. All administration of the project emanates from this headquarters office, which is under the direction of the regional leader. During the field season (April through October) technical advice is given to the field work of the several cooperating agencies by the operation and checking supervisors, who are assigned to specific control jobs. Assignments for 1942 are shown on pages 5 to 7 inclusive.

Early in the year the Bureau held conferences with the cooperating Federal agencies to consider increases in wage and salary rates for temporary personnel. Increases were made necessary by sharply rising wage scales in

*Entitled "For forest protection against the white pine blister rust," approved April 26, 1940; Public 486, 76th Congress, Chapter 159, Third Session, 54th Statute 168,169.

competing forest employment; as in all other lines of work rising wages were caused by the movement of labor into war industries. The new rates agreed upon for all classes of temporary employees engaged in the field programs are shown below; for comparison, rates paid by the Bureau in 1941 are also listed:

Comparison in Wage Earnings by Blister Rust Workers
in 1941 and 1942

Regular Funds

Wages:

<u>Field Title</u>	<u>1941 (Bureau only)</u>	<u>1942 (All Agencies)</u>
Laborer (crewman, kitchen helper, flunky, bull cook)	Before 7/1 - \$.45 hour After 7/1 - .50 hour	\$.60 hour
Laborer (crewleader, 2nd cook, part-time truck driver)	Before 7/1 - .55 hour After 7/1 - .60 hour	\$.70 hour
Laborer (straw boss)	Before 7/1 - .55 hour After 7/1 - .65 hour	\$.70 hour
Assistant camp boss	-	\$150 month
Camp foreman (small camp)	\$166.66 month	166.66 month
Camp supt. (large camp)	-	191.66 month
Junior checker	\$120 month	\$150 month
Senior checker	135 month	166.66 month
Checker foreman	166.66 month	191.66 month
Head cook (large camp)	-	\$155 & \$175 month
Head cook (small camp)	-	140 month
Head cook	\$140 month	-

Board Charges:

<u>Field Title</u>	<u>1941 (Bureau only)</u>	<u>1942 (All Agencies)</u>
All temporary field personnel (laborers, checkers, camp bosses, and cooks)	Before 7/15 - \$.75 day After 7/16 - .90 day	\$1.05 per day*

The permanent personnel of the Oakland headquarters office of the Sugar Pine Region and their assignments in 1942 are given below:

General Supervision

Warren V. Benedict, Senior Forester. Regional Leader
Thomas H. Harris, Forester Assistant Regional Leader

*The Park Service charged \$1.20 a day for board, 10 cents a day for lodging, and \$1.00 a month for hospital service.

Oregon Operation

Conrad P. Wessela, Associate Forester Operation Supervisor
(Commissioned First Lieutenant,
U. S. Army, Sept. 14, 1942)

Lyle N. Anderson, Agent Checking Supervisor

California Operations

Lassen and Plumas National Forests

Benton Howard, Associate Forester Operation Supervisor

S. Daryl Adams, Agent Checking Supervisor

Eldorado and Stanislaus National Forests

Roy Blomstrom, Associate Forester Operation Supervisor
(Commissioned Second
Lieutenant, U. S. Army,
Sept. 28, 1942)

Robert Sovulewski, Agent. Unit Supervisor; promoted to
position of Operation Super-
visor November 16, 1942

Carl W. Fowler, Assistant Forester. Checking Supervisor; promoted
to position of Operation
Supervisor November 16, 1942

Glenn J. Taylor, Agent. Checking Supervisor
(Commissioned Ensign, U. S.
Naval Reserve, March 6, 1942)

Sierra National Forest, Yosemite and Sequoia National Parks

Frank A. Patty, Associate Pathologist Operation Supervisor

John N. Mitchell, Assistant Forester. Checking Supervisor

Scouting and Disease Control

Douglas R. Miller, Associate Forester Assigned in charge Oregon
operation vice C. P. Wessela
on September 14, 1942

Informational Work

John C. Crowell, Agent. Commissioned Lieutenant,
U. S. Naval Reserve
February 16, 1942

Office Administration

Ralph H. Simons, Sr. Administrative Assist. In charge of administrative,
fiscal, clerical, and
employment

Orvis R. Decious, Principal Clerk Bookkeeping

Rose E. Stayton, Clerk-Stenographer Secretarial and personnel

Frances H. DeFreest, Assistant Clerk-Steno. Secretarial and files.
Resigned October 17, 1942

Loa H. Smith, Assistant Clerk.	Pay Rolls
Juliana Arca, Assistant Clerk	Pay Rolls and Clerical
Eudora S. DeTennencourt, Jr. Clerk-	Clerical, Transferred to U. S.
Stenographer. . .	Navy, October 26, 1942
Marion A. Owen, Jr. Clerk-Typist	Files
Ernest G. Pinnella, Agent.	Warehouse Foreman
	(April 2, 1942 transferred to War-
	time Civilian Control Admin.)
Richard F. Leahy, Agent.	Warehouse Foreman

Developmental Work in Control Methods, Berkeley Office

Harold R. Offord, Pathologist. In Charge
 Clarence R. Quick, Associate Pathologist
 Lawrence P. Winslow, Agent
 Catherine Ryan, Assistant Clerk-Stenographer

Forest Service Staff Officers in Charge of Blister Rust Control Work

Eugene H. Kincaid, Assistant Forester . . Plumas National Forest

Three former Forest Service staff officers serve with the armed forces as follows:

Lieutenant Arthur London, U. S. Naval Reserve, formerly Stanislaus National Forest.
 Lieutenant W. W. Spinney, U. S. Naval Reserve, formerly Sierra National Forest.
 Captain Ralph A. James, U. S. Army, formerly Plumas National Forest.

WORK PERFORMED

Leadership and Coordination

Those public or private agencies engaging in or contributing to the control program in California and Oregon may be arranged in three groups. The first includes those Federal agencies that, receiving specific appropriations from Congress, conducted actual control (Ribes eradication) activities on white pine lands in their stewardship or on lands the protection of which is their responsibility. The second includes those organizations that participated in the cooperative Ribes eradication project on state and private lands through financial contributions; the basis for the participation is contained in Memoranda of Agreement concluded between the Bureau and the cooperators. The results of this project are reported in Part III. The third group contains those that, under Memoranda of Agreement with the Bureau, made available to the control program at no financial cost to the Federal Government a variety of services and facilities. The groups are as follows:

1. Agencies conducting Ribes eradication under Congressional appropriation:
 - a. U. S. Department of Agriculture
 - (1) Bureau of Entomology and Plant Quarantine
 - (2) Forest Service

b. U. S. Department of the Interior

- (1) National Park Service
- (2) Oregon and California Revested Lands Administration

2. Agencies participating in cooperative Ribes eradication on state and private lands in California.

- a. State of California
- b. Michigan-California Lumber Company
- c. Diamond Match Company
- d. Red River Lumber Company
- e. Bureau of Entomology and Plant Quarantine

3. Agencies contributing facilities and services under Memoranda of Agreement with the Bureau of Entomology and Plant Quarantine.

a. State of California

- (1) Division of Forestry, Department of Natural Resources
- (2) Department of Agriculture
- (3) College of Agriculture, University of California
- (4) Botanical Garden, University of California

b. State of Oregon

- (1) Oregon State Board of Forestry
- (2) Division of Plant Industry, Department of Agriculture

The responsibility of the Bureau lay in correlating the blister rust control activities of these agencies into a unified program, in furnishing technical direction to the separate projects, and in pointing the way to a successful, long-range program of control. To implement this responsibility, the Regional Leader and his assistants throughout the year held conferences with the agencies in which policies and plans of work were formulated, and the work of the agencies correlated one with another, so that the control program for the Region presented a unified whole.

Close contact was maintained with the State of California, which was continuing its cooperation with the Bureau in the Ribes eradication work on state and private lands. The appropriation of \$50,000 for the biennium July 1, 1941 to June 30, 1943 financing the State's share of the work had been made in 1941. A new Memorandum of Agreement, superseding the agreement of 1936, was concluded in January 1942 between the Bureau and the several agencies of the State of California cooperating in the blister rust program. The financial participation in control work by the State made the new agreement necessary. A separate agreement between the Bureau and the State Division of Forestry was reached in November regarding the use of personnel of Bureau-operated camps and Bureau equipment to supplement state forces and equipment on state fires, i.e., fires handled by the State Division of Forestry.

During 1942 three California lumber companies participated financially in cooperative control work (Ribes eradication) involving their lands. Memoranda of Agreement covering their participation were signed by the Bureau and the companies, namely the Michigan-California Lumber Company, the Diamond Match Company, and the Red River Lumber Company. Each firm contributed \$2,000 in cash. Results accomplished with this money are reported in Part III.

Technical Direction of Ribes Eradication

A general plan of blister rust control work for the Sugar Pine Region in 1942 including all agencies involved in the program was prepared, as well as separate plans covering the work of each participant. Through the Bureau's operation supervisors, one of whom was stationed on each of the principal operations in California and Oregon, technical information and direction of all aspects of the control job were given to the cooperating agencies. This included field inspections of control work followed by recommendations, the application of accepted standards of control, the interpretation of checking data, furnishing of manuals of instruction to guide the field work, preliminary surveys of areas to be worked, and advice on special control problems. The operation supervisors prepared special reports covering technical problems of importance or difficulty arising in the cooperative work.

A change in the strategy of control on the Lassen and Plumas National Forests was adopted this year because of the presence of the disease there within certain control units. In the vicinity of Cascade in the southwestern part of the Plumas National Forest blister rust had been discovered on Ribes in 1938, on sugar pines and Ribes along three streams in 1941, and along one additional stream in 1942. Along Bailey Creek near Viola on the Lassen National Forest the rust had been found on Ribes in 1938 and on sugar pines in 1940. To control the disease in these districts, it was obvious that Ribes eradication should be completed within the next few years. But the amount of money and labor available for use in 1942 (and probably the amount that will be available in the next two or three years) was too small to finance any but a small part of the work necessary. Therefore, some delay measure that would represent the greatest amount of protection per dollar expended was needed.

The delay measure adopted was the removal of Ribes from those sites which experience has taught are highly favorable to the incidence and the development of blister rust. These sites are usually along streams, but may occur on ridge tops, in clearings along roads, and in recent burns. By far the largest part of the Ribes eradication work designed to delay the spread of the rust, both on the Lassen and the Plumas National Forests, was done along the borders of streams. In the Cascade Unit, Ribes populations along streams are heavy, the uplands moderate. Removal of Ribes from stream type, although it would result in the destruction of only a small part of the total population, would remove them from the moistest sites where conditions favorable to the propagation of the rust on Ribes and on pines occur most frequently. The removal of Ribes growing along streams and in other favorable sites, therefore, would delay the intensification of the rust in the unit, though it would by no means prevent additional, slower-developing infections in the nearby uplands. Nearly all infections discovered to date have been in stream type. During 1942 Ribes were removed from nearly all streams and other sites having a high rust hazard in the Cascade Unit.

In the Viola Unit on the Lassen National Forest a very large part of the Ribes population is concentrated along the streams, particularly along Bailey Creek where Ribes inerme is abundant. Stream-type eradication here, also performed in 1942, actually afforded a high degree of protection to the entire unit because of the scarcity of Ribes in the uplands.

Checking

During the progress of eradication work the Bureau's staff of trained checkers operating under the direction of the checking supervisors made systematic sample checks of all areas throughout the Region upon which Ribes eradication was performed. These checks were designed to maintain uniform standards of eradication. Other sample checks supplied advance information on Ribes populations that was used to plan effectively the work of the eradication crews. Six senior checkers and 26 junior checkers were employed in the Region.

Arrangements were made with the other Federal agencies, as in previous years, for the conduct of checking work on their projects. These arrangements, authorized by the Memoranda of Understanding existing between the Bureau and the Federal agencies, permitted the employment of all checkers by the Bureau with reimbursement from the other agencies for the salaries of checkers assigned to their projects. Under this system the Bureau was wholly responsible for all checking work, which, being a notably technical activity, conformed to the Bureau's position as director of technical work.

The organization of the checking work remained the same as in previous years, and no departure from standard checking methods was adopted except in post checking. The amplified method of post checking described in the Annual Report for 1941 was used throughout the Region. This method, designed to obtain additional data for a study of checking standards, will not be generally used in the future.

The checking supervisors analyzed statistically the results of a checking experiment performed during the field season of 1941. Their findings were presented in a paper titled "The Forty-Acre Checking Experiment" by John N. Mitchell, Glenn J. Taylor, Carl W. Fowler, and S. Daryl Adams.

The amount of work performed in 1942 in each of the three classes of checking is summarized for the Region in tables number 7, 8, 9, and 10, pages 24 to 28. In the reports for the separate agency projects are given brief summaries of the checking work done for those agencies. Brief explanatory comments on the tables follow:

Table 7: In the column headed "Acres Covered" are shown all acres on which a check was conducted. The acreage of a tract receiving a first regular check is included although in some instances no final check was conducted. Whenever a post check or advance check less than five per cent was sufficient to determine the population classes, all acres in the section were claimed.

The "Per cent of Check" was determined by dividing the acres in check strips by the acres covered by check.

Under "Man Days" are included all man days actually spent running check strips and proportional amounts of office, training, and travel time. The time of the checking supervisors, annual leave, sick leave, and off-duty time of the checkers is not included in the report.

Table 8: The "Man Days" figures were taken from Table 7. The "Strip Acres" include the total acreage of all check strips. For regular check this includes all first check and recheck strip acres. "Strip Acres per Checker Man Day" were computed on the basis of man days shown in this table. "Strip Acres per Checker Field Man Day" were computed on the basis of man days actually spent on check strips.

The "Total Cost" was computed according to the number of man days spent on each class of check. The cost per effective man day was determined from the total man days in Tables 8 and 9, the total gross salaries of all checkers, and the cost of checking transportation at the rate of four cents a mile.

The "Cost Per Acre Basis of Acres Covered by Check" was computed from the preceding cost figure and the acreage figures from Table 7.

Table 9: The "Man Days" were obtained directly from the Checkers Time Summaries. The "Total Cost" was computed from the cost per effective man day as in Table 8.

Table 10: The "Man Days" and "Total Cost" under "All Regular Checks" were obtained from Table 9. The acreage for first check was taken from Table 7. The "Total Cost" for first check and rechecks was found by multiplying the number of man days spent on each by the cost per effective man day.

Scouting for Blister Rust

According to a systematized plan and schedule the Bureau continued its scouting project under the direction of D. R. Miller. In northern California and southern Oregon both inside and outside control units favorable localities for the occurrence of blister rust were searched and old infection centers were reexamined and studied. Twenty one thousand cankers were pruned from 2,675 diseased pines.

The project is reported in full in Part VII, pp. 80-110, and a concise summary of work and findings in 1942 will be found on pages 95-96 inclusive.

Keeping of Master Records

To effect coordination of the work of the several agencies and to supply them with data necessary to the effective planning of their programs, the Bureau prepares and keeps a master set of records uniform for all control work in the Region. Briefly summarized, these records are:

A. Permanent records of field work

1. Ribes eradication

- a. An annual record of Ribes eradication on each section of land (640 acres) on each operation in card index form.
- b. Master maps, scale 2 inches = 1 mile, of each township showing:
 - (1) Status of eradication
 - (2) Population of Ribes before each working and control standards applied
 - (3) Areas on maintenance
 - (4) Disturbance maps
- c. In atlas form, summaries of Ribes eradication by operation accompanied by operational maps showing:
 - (1) Control units and status of eradication
 - (2) Ownership of control units
 - (3) White pine types

2. Checking

Field maps of each section of land (640 acres, Public Land Survey) on a scale of 8 inches = 1 mile showing:

- (1) Populations of Ribes before initial eradication (advance check maps)
- (2) Populations after eradication (regular check maps)
- (3) Populations before reeradication (post check maps)

3. Records of blister rust infections

B. Summaries presented in the annual report.

1. Regional summaries (pp. 18-28)

- a. Current status of Ribes eradication by land ownership (pp. 18-19)
- b. Ribes eradication performed in 1942 (p. 20)
- c. Status of Ribes reeradication (p. 21)
- d. Summaries of checking work (pp. 24-28)
- e. Special condensed summaries of all control activities and expenditures prepared at the request of the Washington office and called "Omnibus Tables" (pp. 29-34)
- f. Financial statements (pp. 12-16)

2. Project summaries (for projects of Forest Service, National Park Service, Oregon and California Revested Lands Administration, and Bureau of Entomology and Plant Quarantine).

- a. Ribes eradication performed by the agency (or project)
 - (1) All work done to date
 - (2) Work done in 1942
- b. Checking work in 1942
- c. Status of Ribes eradication on lands in jurisdiction of agency.
 - (1) All work done to date
 - (2) Work done in 1942
- d. Statement of funds expended

All summary tables of Ribes eradication work in this report were compiled by Benton Howard and Carl W. Fowler, Associate Foresters, and all checking tables by S. D. Adams, Agent, assisted by the other checking supervisors.

FINANCIAL STATEMENTS

The calendar year 1942 marks the first year in which an active control program was carried on in the Sugar Pine Region without the aid of emergency relief projects. No WPA blister rust control projects operated in the Region and, although some assistance from CCC camps was scheduled for the spring work, reduced manpower of the CCC program and its dissolution entirely on June 30, 1942 made assistance from that source negligible. In fact except for 222 man days of CCC labor utilized in Oregon under the jurisdiction of the O and C Administration, no CCC labor was used on blister rust control activities.

Also 1942 marks the first year in this Region in which control operations financed by cash contributions from State and private cooperators were conducted. In Part III on page 55, will be found Table 7 which shows the amounts contributed and the expenditures made from such funds.

Financial Table 1 immediately following shows the allotments made to cooperating Federal agencies from regular Congressional appropriations for expenditure in the Sugar Pine Region during the fiscal year 1942 and the fiscal year 1943, respectively. Financial Table 2 shows the expenditures by these same agencies for the respective halves of the two fiscal years making up the calendar year 1942. A comparison with similar tables in last year's annual report will provide a means for determining unexpended balances for the fiscal year 1942. Except for minor balances which must be retained as a reserve against the possibility of overexpending an allotment, all allotments of regular funds made for blister rust control in this Region were utilized during the fiscal year 1942. It is anticipated that the remaining balances of 1943 fiscal year allotments will also be fully utilized, although changing conditions caused by the war might affect the conduct of the blister rust control program and consequently the expenditures of its funds.

Financial Table 3 pertains only to expenditures of this Bureau and shows expenditures by project and appropriation symbol, and by State separated to show amounts expended for salaries and wages, and for other expenses. The amounts shown as salaries are the net payments after deductions for subsistence from the earnings of the employees. The cost of subsistence supplies is included under "Expenses". Also included as a part of this table are the expenditures of the Developmental and Investigative Unit headquartered at Berkeley, whose bookkeeping records are maintained and vouchers processed through the Oakland Regional Office. The expenditure of the Berkeley Unit include the salaries, expenses, and operating costs of two of its personnel headquartered at the Northwestern Regional Office at Spokane, Washington.

Omnibus Tables 5 and 6A present a summary of expenditures for 1942 and a summary of expenditures for the entire period of operation for all cooperating agencies and for emergency fund programs as well as regular fund programs.

TABLE 1

FISCAL YEAR ALLOTMENTS FROM WHICH FEDERAL EXPENDITURES WERE MADE
IN THE SUGAR PINE REGION DURING CALENDAR YEAR 1942

ALL REGULAR FUNDS

<u>Agency</u>	<u>Fiscal Year 1942</u>	<u>Fiscal Year 1943*</u>
Bureau of Entomology and Plant Quarantine	\$ 75,995	\$ 134,695
Forest Service, Region V (California).	181,000	286,192
Forest Service, Region VI (Oregon)	4,000	41,000
National Park Service:		
Yosemite National Park	58,815	50,000
Sequoia National Park	5,455	19,850
Regional Office	4,900	4,200
Oregon and California Revested Lands Administration	<u>30,000</u>	<u>54,970</u>
Total - Sugar Pine Region.	\$ 360,165	\$ 590,907

*Figures in this column represent allotments as they are known as of December 31, 1942 - subject to change until June 30, 1943.

TABLE 2

FEDERAL EXPENDITURES IN THE SUGAR PINE REGION FOR CALENDAR YEAR 1942

REGULAR FUNDS

Agency	California		Oregon		Region
	Fiscal Year 1942 1/1/42-6/30/42	Fiscal Year 1943 7/1/42-12/31/42	Fiscal Year 1942 1/1/42-6/30/42	Fiscal Year 1943 7/1/42-12/31/42	
Bureau of Entomology and Plant Quarantine	\$ 32,358	\$ 62,429	\$ 3,286	\$ 4,081	\$ 102,154
Forest Service, Region V	68,282	145,763	-	-	214,045
Forest Service, Region VI	-	-	1,860	11,150	13,010
National Park Service:					
Yosemite National Park.	25,851	34,229	-	-	60,080
Sequoia National Park	4,839	14,836	-	-	19,675
Regional Office	2,304	1,870	-	-	4,174
Oregon and California Revested Lands Administration	-	-	12,024	22,191	34,215
Total - Sugar Pine Region.	\$ 133,634	\$ 259,127	\$ 17,170	\$ 37,422	\$ 447,353

TABLE 3

CLASSIFIED BUREAU EXPENDITURES BY STATE, APPROPRIATION SYMBOL, AND PROJECT

Sugar Pine Region - January 1 to December 31, 1942

Appropriation Symbol Project No.	1222245(13).031		1232245(66).030		12X8200(13).213*			
	3101.14	3103.14	3101.14	3103.14	X2132.14	X2133.14	X2134.14	X2135.14
California								
Salaries	\$ 27,435.76	\$ 20,303.12	\$ 28,079.96	\$ 29,876.23	\$ 1,997.00	\$ 1,950.75	\$ 1,951.85	\$ 111,594.67
Expenses	4,922.31	4,119.80	9,925.81	5,759.83	-	-	-	24,727.75
Total	32,358.07	24,422.92	38,005.77	33,636.06	1,997.00	1,950.75	1,951.85	136,322.42
Oregon								
Salaries	3,149.88	3,750.16	-	-	-	-	-	6,900.04
Expenses	135.73	330.82	-	-	-	-	-	466.55
Total	3,285.61	4,080.98	-	-	-	-	-	7,366.59
Sugar Pine Region								
Salaries	30,585.64	24,053.28	28,079.96	29,876.23	1,997.00	1,950.75	1,951.85	118,494.71
Expenses	5,058.04	4,450.62	9,925.81	5,759.83	-	-	-	25,194.30
Total	\$ 35,643.68	\$ 28,503.90	\$ 38,005.77	\$ 33,636.06	\$ 1,997.00	\$ 1,950.75	\$ 1,951.85	\$ 143,689.01
*Contributed cooperative funds: X12132.14 State of California, Division of Forestry - \$50,000; X2133.14 Diamond Match Company - \$2,000; X2134.14 Michigan-California Lumber Company - \$2,000; X2135.14 Red River Lumber Company - \$2,000.								
D & I Unit**								
Salaries	\$ 8,943.01	\$ 9,381.34	-	-	-	-	-	\$ 18,324.35
Expenses	418.70	619.89	-	-	-	-	-	1,038.59
Total	\$ 9,361.71	\$ 10,001.23	-	-	-	-	-	\$ 19,362.94

**Amounts shown in these columns represent expenditures of the Developmental and Investigative Unit headquartered at Berkeley from fund allocated directly to that Unit, but whose accounts and vouchers were processed by the Oakland business office.



OMNIBUS TABLE #5
SUMMARY OF EXPENDITURES FOR 1942

State	Total			Recapitulation of Federal Funds								
	Federal (All Agencies Including State WPA Projects)	State (Including all Coop. Funds)	Grand Total	Regular Funds						Emergency Funds		
				Bureau Entomology & Plant Quarantine		Forest Service	Department Of Interior		Total Regular Funds	State W.P.A.	C.C.C. & S.C.S.	Total Emergency Funds
				Leadership & Coord. (3101)	Lea Act (3103)		National Parks	O & C				
California	\$392,761	\$51,736	\$444,497	\$56,781	\$38,006	\$214,045	\$83,929	-	\$392,761	-		
Oregon	54,925	1,000	55,925	7,367	-	13,010	-	\$34,215	54,592	-	\$333	\$333
Total - -	\$447,686	\$52,736	\$500,422	\$64,148	\$38,006	\$227,055	\$83,929	\$34,215	\$447,353	-	\$333	\$333

State	Financial Projects											
	BLR-1 - Leadership, Coordination and Technical Direction				BLR-3 - Cooperative Blister Rust Control on State and Privately-Owned Lands				BLR-4 Forest Service	BLR-5 National Parks	BLR-6 O & C Revegeted Lands	BLR-7 Indian Reservations
	Indirect Aid -State	Federal Regular	Federal Emergency	Total	Direct Aid State*	Federal Regular	Federal Emergency	Total				
California	\$10,200	\$56,781	-	\$66,981	\$41,536	\$38,006	-	\$79,542	\$214,045	\$83,929	-	-
Oregon	1,000	7,367	-	8,367	-	-	-	-	13,010	-	\$34,548	-
Total - -	\$11,200	\$64,148	-	\$75,348	\$41,536	\$38,006	-	\$79,542	\$227,055	\$83,929	\$34,548	-

*Including all local cooperative funds

OMNIBUS TABLE #6A
SUMMARY OF ALL EXPENDITURES, 1918*-1942 (INCLUSIVE)

State	Federal (All Agencies Including State WPA Projects)	State (Including All Coop Funds)		Grand Total (State and Federal Funds)	Recapitulation of Regular Funds					
		Indirect Aid	Direct Aid (Ribee Erad.)		B.P.I. & B.E.P.Q.	Forest Service	Department of Interior			Total
							National Park	O & C	Total	
California	\$5,080,124	\$289,500**	\$41,536	\$5,411,160	\$732,475	\$778,633	\$119,264	-	\$119,264	\$1,630,372
Oregon	933,129	183,300**	-	1,116,429	266,847	15,387	-	\$52,007	52,007	334,241
Total - -	\$6,013,253	\$472,800**	\$41,536	\$6,527,589	\$999,322	\$794,020	\$119,264	\$52,007	\$171,271	\$1,964,613

State	Recapitulation of Emergency Funds											
	Federal W.P.A.			State W.P.A. (All Bureau)	C.C.C. and S.C.S.			F.W.A.			CWA, ARA, ERA, NYA, & C. O. Campe	Grand Total
	Bureau	Forest Service	Total		Forest Service and State Campe	Dept. Interior	Total	Bureau	Forest Service	Total		
California	\$1,855,438	\$509,542	\$2,364,980	-	\$218,715	\$192,692	\$411,407	\$396,438	\$276,927	\$673,365	-	\$3,449,752
Oregon	479,062	-	479,062	\$20,666	1,126	6,021	7,147	89,507	-	89,507	\$2,506***	598,888
Total - -	\$2,334,500	\$509,542	\$2,844,042	\$20,666	\$219,841	\$198,713	\$418,554	\$485,945	\$276,927	\$762,872	\$2,506	\$4,048,040

*No expenditures in Sugar Pine Region prior to 1923.

**Not shown or included in previous Omnibus expenditure tables.

***\$528.00 NYA previously included with Bureau WPA plus \$1,978.00 Agricultural Reestablishment Administration previously included with Bureau regular.



REGIONAL SUMMARY TABLES
OF
RIBES ERADICATION AND OF CHECKING



TABLE #1
THE STATUS OF RIBES ERADICATION IN THE SUGAR PINE REGION AS OF DECEMBER 31, 1942

Part A - California

Control Operation	Class of Ownership	Control Units		Status of Ribes Eradication								
		Total Acres	Acres Unworked	First Working			Reeradication			Total All Workings		
				Acres Worked	Man Days	Ribes Eradicated	Acres Worked	Man Days	Ribes Eradicated	Acres Worked	Man Days	Ribes Eradicated
National Forests												
Mendocino	Federal	21,017	21,017									
	Private	15,179	15,179									
	State	48	48									
	Total -	36,244	36,244									
Trinity	Federal	122,575	122,575									
	Private	40,283	40,283									
	State	2,088	2,088									
	Total -	164,946	164,946									
Klamath	Federal	19,650	16,451	3,199	2,265	335,085				3,199	2,265	335,085
	Private	26,850	19,864	6,986	5,948	432,092				6,986	5,948	432,092
	State	46,500	36,315	10,185	8,213	767,177				10,185	8,213	767,177
	Total -	92,999	72,630	19,370	16,426	1,534,354				19,370	16,426	1,534,354
Shasta	Federal	3,611	3,611									
	Private	74,151	74,151									
	State	77,762	77,762									
	Total -	155,524	155,524									
Lassen	Federal	62,172	61,758	7,414	3,510	575,188	1,739	507	28,098	9,153	4,017	603,286
	Private	243,921	210,715	33,206	19,224	2,621,714	10,303	3,946	439,431	43,509	23,170	3,061,145
	State	1,055	1,055									
	Total -	314,148	273,528	40,620	22,734	3,196,902	12,042	4,453	467,529	52,662	27,187	3,664,431
Plumas	Federal	186,585	107,803	78,782	53,901	10,100,335	35,802	21,566	1,897,914	114,584	75,467	11,998,249
	Private	125,630	60,147	65,483	44,090	8,748,818	33,206	20,593	2,479,761	98,689	64,683	11,228,579
	State	360	320	40	21	4,620				40	21	4,620
	Total -	312,575	168,270	144,305	98,012	18,853,773	69,008	42,159	4,377,675	213,313	140,171	23,231,448
Tahoe	Federal	19,925	19,925									
	Private	19,983	19,983									
	State	32,908	32,908									
	Total -	72,816	72,816									
Eldorado	Federal	117,725	51,262	66,463	33,029	9,511,905	34,328	21,287	1,423,452	100,791	54,316	10,935,357
	Private	126,507	44,318	82,189	49,064	12,756,626	36,606	21,403	1,812,930	118,795	70,467	14,569,556
	State	2,642	40	2,602	1,634	310,891				2,602	1,634	310,891
	Total -	246,874	95,620	151,254	83,727	22,579,422	70,934	42,690	3,236,382	222,188	126,417	25,815,804
Stanislaus	Federal	106,691	30,192	76,499	32,135	7,982,578	70,232	29,249	5,179,245	146,731	61,384	13,161,823
	Private	122,526	18,705	103,821	47,984	16,628,890	53,134	26,708	2,652,582	156,955	74,692	19,281,472
	State	407	407		129	16,768				407	129	16,768
	Total -	229,624	48,897	180,727	80,248	24,628,336	123,366	55,957	8,431,827	304,093	136,205	33,060,163
Sierra	Federal	173,391	126,686	46,705	88,169	18,133,056	30,187	19,962	7,952,162	76,892	108,131	26,085,218
	Private	49,082	32,926	16,156	24,382	5,708,223	6,785	4,185	870,735	22,941	28,567	6,578,958
	State	40	40									
	Total -	222,513	159,652	62,861	112,551	23,841,279	36,972	24,147	8,822,897	99,833	136,698	32,664,176
Sequoia	Federal	43,930	43,930									
	Private	18,880	18,880									
	State	62,810	62,810									
	Total -	125,620	125,620									
Total All National Forests	Federal	884,272	605,210	279,062	213,009	46,638,247	172,288	92,571	17,080,871	451,350	305,580	63,719,118
	Private	866,992	555,151	307,841	190,692	46,896,563	140,034	76,855	8,255,459	447,875	267,527	55,151,802
	State	6,640	3,591	3,049	1,784	332,279				3,049	1,784	332,279
	Total -	1,757,904	1,163,952	589,952	405,485	93,866,889	312,322	169,406	25,336,310	902,274	574,891	119,203,199
National Parks												
Lassen Volcanic	Federal	17,792	4,042	13,750	5,215	700,361				13,750	5,215	700,361
	Private	140	-	140	55	14,977				140	55	14,977
	State	17,932	4,042	13,890	5,270	715,338				13,890	5,270	715,338
	Total -	35,864	8,084	27,780	10,540	1,430,676				27,780	10,540	1,430,676
Yosemite	Federal	120,620	63,372	57,248	84,449	12,170,565	8,212	12,107	2,297,057	65,460	96,556	14,467,622
	Private	2,510	2,510									
	State	123,130	65,882	57,248	84,449	12,170,565	8,212	12,107	2,297,057	65,460	96,556	14,467,622
	Total -	246,260	131,764	114,496	168,898	24,341,130	16,424	24,214	4,594,114	130,920	193,112	28,939,864
Kings Canyon	Federal	22,430	19,189	3,241	5,132	836,010				3,241	5,132	836,010
	Private											
	State	82,678	75,022	7,656	7,251	990,417				7,656	7,251	990,417
	Total -	105,108	94,211	10,897	12,383	1,826,427				10,897	12,383	1,826,427
Total All National Parks	Federal	243,520	161,625	81,895	102,047	14,697,353	8,212	12,107	2,297,057	90,107	114,154	16,994,410
	Private	2,650	2,510	140	55	14,977				140	55	14,977
	State	246,170	164,135	82,035	102,102	14,712,330	8,212	12,107	2,297,057	90,247	114,209	17,009,387
	Total -	492,340	328,270	164,070	204,204	29,424,660	16,424	24,214	4,594,114	180,494	228,418	34,018,774
State Parks												
Latour	Private	1,200	1,200									
	State	1,160	1,160									
	Total -	2,360	2,360									
Calaveras Big Trees	Private	120	-	120	21	3,260	75	20	722	195	41	3,982
	State	1,973	225	1,748	1,318	185,001	1,265	472	26,595	3,013	1,790	211,596
	Total -	2,093	225	1,868	1,339	188,261	1,340	492	27,317	3,208	1,831	215,578
	Total All State Parks	Private	1,320	1,200	120	21	3,260	75	20	722	195	41
State		3,133	1,385	1,748	1,318	185,001	1,265	472	26,595	3,013	1,790	211,596
Total -		4,453	2,585	1,868	1,339	188,261	1,340	492	27,317	3,208	1,831	215,578
Total												
Total All Control Operations	Federal	1,127,792	758,835	350,957	315,055	61,335,500	180,500	104,678	19,377,928	541,557	449,734	80,713,528
	Private	866,962	558,861	308,101	190,768	46,914,600	140,109	76,855	8,255,161	448,210	267,623	55,170,761
	State	9,773	4,976	4,797	3,102	517,280	1,265	472	26,595	6,062	3,574	543,875
	Total -	2,004,527	1,330,672	673,855	508,925	108,767,480	321,874	182,005	27,660,684	995,729	690,931	136,428,164



TABLE #1 (Continued)

THE STATUS OF RIBES ERADICATION IN THE SUGAR PINE REGION AS OF DECEMBER 31, 1942

Part B - Oregon

Control Operation	Class of Owner-ship*	Control Units		Status of Ribes Eradication								
		Total Acres	Acres Unworked	First Working			Reeradication			Total All Workings		
				Acres Worked	Man Days	Ribes Eradicated	Acres Worked	Man Days	Ribes Eradicated	Acres Worked	Man Days	Ribes Eradicated
National Forests												
Klamath	National Forest	9,031	5,292	3,739	4,607	419,719				3,739	4,607	419,719
	O & C	4,573	4,573									
	Total	13,604	9,865	3,739	4,607	419,719				3,739	4,607	419,719
	Private	1,552	723	829	1,882	113,810				829	1,882	113,810
	Total	15,156	10,588	4,568	6,489	533,529				4,568	6,489	533,529
Rogue River	National Forest	87,491	22,336	65,155	38,574	14,496,200	22,460	6,626	916,277	87,615	45,200	15,412,477
	O & C	17,350	11,956	5,394	1,154	196,371				5,394	1,154	196,371
	Total	104,841	34,292	70,549	39,728	14,692,571	22,460	6,626	916,277	93,009	46,354	15,608,848
	Private	79,010	9,107	69,903	6,902	1,105,988	12,192	1,853	172,531	82,095	8,755	1,278,519
	Total	183,851	43,399	140,452	46,630	15,798,559	34,652	8,479	1,088,808	175,104	55,109	16,887,367
Siskiyou	National Forest	67,572	54,064	13,508	3,519	251,132				13,508	3,519	251,132
	O & C	101,460	73,370	28,090	6,938	403,922				28,090	6,938	403,922
	Total	169,032	127,434	41,598	10,457	655,054				41,598	10,457	655,054
	Private	77,347	44,752	32,595	5,446	497,029				32,595	5,446	497,029
	Total	246,379	172,186	74,193	15,943	1,152,083				74,193	15,946	1,160,411
Umpqua**	National Forest	60,353	60,353									
	O & C	6,158	6,158									
	Total	66,511	66,511									
	Private	8,266	8,266									
	Total	74,777	74,777									
Total All National Forests	National Forest	224,447	142,045	82,402	46,700	15,167,051	22,460	6,626	916,277	104,862	53,326	16,083,328
	O & C	129,541	96,057	33,484	8,092	600,293				33,484	8,092	600,293
	Total	353,988	238,102	115,886	54,792	15,767,344	22,460	6,626	916,277	138,346	61,418	16,683,621
	Private	166,175	62,848	103,327	14,230	1,716,827	12,192	1,853	172,531	115,519	16,083	1,889,358
	Total	520,163	300,950	219,213	68,922	17,484,171	34,652	8,479	1,088,808	253,865	77,509	18,572,979
National Parks												
Crater Lake	Federal	3,782	150	3,632	412	130,162	350	81	13,430	3,982	493	143,592
Nursery Sanitation												
McDonald State Forest (Clark-McNary Nursery)	Private	418	-	418	178	2,547				418	178	2,547
	State	462	50	412	174	2,472				412	174	2,472
	Total	880	50	830	352	5,019				830	352	5,019
O & C (McKinley Nursery)	O & C	168	128	40	111	2,877				40	111	2,877
	Private	132	92	40	111	2,877				40	111	2,877
	Total	300	220	80	222	5,754				80	222	5,754
Total All Nurseries	O & C	168	128	40	111	2,877				40	111	2,877
	Private	550	92	458	289	5,424				458	289	5,424
	Total	718	220	498	400	8,301				498	400	8,301
Mt. Hebo White Pine Plantation												
Siuslaw National Forest	Federal	680	-	680	373	124,744	212	228	29,957	892	601	154,701
Total												
Total All Control Operations	Federal	358,618	238,380	120,238	55,688	15,025,127	23,022	6,935	959,664	143,260	62,623	16,984,791
	Private	166,725	62,940	103,785	14,519	1,722,251	12,192	1,853	172,531	115,977	16,372	1,839,782
	State	1,450	738	712	217	10,800				712	217	10,800
	Total	526,793	302,058	224,735	70,424	17,758,178	35,214	8,788	1,132,195	259,949	79,212	18,835,373

*Ownership as of February 15, 1939

**Ownership of 10,128 acres of federal land controversial between the United States Forest Service and the Oregon and California Revested Lands Administration. In these computations this acreage classed as National Forest Lands.

Part C - Total For The Sugar Pine Region

California and Oregon	Federal	1,486,410	1,005,215	481,195	370,744	77,350,727	203,522	111,613	20,337,592	684,717	482,357	97,698,319
	Private	1,033,687	621,801	411,886	205,287	48,635,851	152,301	78,708	8,428,692	564,187	283,995	57,065,543
	Total	2,520,097	1,627,016	893,081	576,031	125,986,578	355,823	190,321	28,766,284	1,248,904	766,352	154,763,862



TABLE 2

SUMMARY OF ALL RIBES ERADICATION IN THE SUGAR PINE REGION - 1942

Operation	Class of Work	Acres Worked	8-Hour Man Days	Total Ribes Eradicated
California				
Klamath Nat'l Forest	Initial	5,327	5,332	558,441
	Initial	973	904	232,894
Lassen Nat'l Forest	Reeradication	5,403	1,784	251,836
	Total	6,376	2,688	484,730
Plumas Nat'l Forest	Initial	8,629	7,265	1,646,233
	Reeradication	1,472	395	161,235
	Total	10,101	7,660	1,807,468
Eldorado Nat'l Forest	Initial	4,325	2,423	444,989
	Reeradication	3,186	852	137,718
	Total	7,511	3,275	582,707
Stanislaus Nat'l Forest	Initial	725	892	325,838
	Reeradication	3,500	2,545	377,959
	Total	9,225	3,437	703,797
Sierra Nat'l Forest	Initial	294	486	75,081
	Reeradication	3,719	3,934	953,895
	Total	4,013	4,420	1,028,976
National Forest	Initial	20,773	17,302	3,283,476
Total	Reeradication	22,280	9,510	1,882,643
	Total	43,053	26,812	5,166,119
Calaveras Big Trees State Park	Reeradication	1,125	466	22,525
Yosemite Nat'l Park	Initial	10,189	7,570	842,425
	Reeradication	346	585	92,130
	Total	10,535	8,155	934,555
Sequoia Nat'l Park	Initial	3,000	2,262	359,333
National Park	Initial	13,189	9,832	1,201,758
Total	Reeradication	346	585	92,130
	Total	13,535	10,417	1,293,888
All California	Initial	33,962	27,134	4,485,234
Total	Reeradication	23,751	10,561	1,997,298
	Total	57,713	37,695	6,482,532
Oregon				
Rogue River Nat. For.	Reeradication	1,510	962	149,346
Siskiyou Nat'l For.	Initial	8,066	1,573	69,075
Siuslaw Nat'l For.	Initial	80	222	5,754
All Oregon	Initial	8,146	1,795	74,829
Total	Reeradication	1,510	962	149,346
	Total	9,656	2,757	224,175
Sugar Pine Region				
California and Oregon	Initial	42,108	28,929	4,560,063
	Reeradication	25,261	11,523	2,146,644
	Total	67,369	40,452	6,706,707

TABLE #3

SUMMARY OF RIBES EXODICATION BY AGENCY AND BY LAND OWNERSHIP IN THE SUGAR PINE REGION - 1942

Work Agency	Acres		Per Acre Worked	8-Hour Man Days	Total Ribes Exodicated	O w n e r s h i p S t a t e s				R i b e s E x o d i c a t e d				Acres Ribes-free at time of Exo- dication						
						A c r e s C o v e r e d				F e d e r a l										
	Worked	Blocked Out				Forest	Park	Service	O & C	Total	State	Private	Forest Service	Park Service	Total	State	Private			
Initial Work																				
California:																				
B.E.P.O.	6,878	470	7,308	5,113	1,291,404	0.77	188	1,488												
Forest Service	11,885	1,580	13,465	11,989	1,932,072	1.01	168	8,371												
Park Service	9,350	3,639	13,189	9,832	1,201,758	1.05	129	13,189												
Subtotal	26,113	5,649	31,962	27,134	4,485,234	0.97	160	23,048												
Oregon:																				
O & C Admin.	2,274	5,872	8,146	1,795	74,829	0.79	33	3,443												
Total	30,387	11,721	42,108	28,929	4,560,063	0.95	193	3,443												
Reexodication																				
California:																				
B.E.P.O.	12,086		12,086	3,541	478,029	0.29	140	905												
Forest Service	11,319		11,319	6,435	1,427,159	0.57	126	8,344												
Park Service	346		346	585	92,130	1.55	266	346												
Subtotal	23,751		23,751	10,561	1,957,298	0.44	64	9,249												
Oregon:																				
Forest Service	1,510		1,510	962	149,346	0.64	99	1,510												
Total	25,261		25,261	11,523	2,146,644	0.46	85	10,759												
All Workings																				
California:																				
B.E.P.O.	18,984	470	19,454	8,654	1,759,431	0.47	93	2,393												
Forest Service	23,234	1,580	24,784	18,424	3,432,231	0.79	167	10,125												
Park Service	9,606	3,639	13,535	10,417	1,293,688	1.07	133	13,535												
Subtotal	51,864	5,649	57,713	31,695	6,482,532	0.73	124	19,108												
Oregon:																				
Forest Service	1,510		1,510	962	149,346	0.64	99	1,510												
O & C Admin.	2,274	5,872	8,146	1,795	74,829	0.79	33	4,665												
Subtotal	3,784	5,872	9,656	2,757	224,175	0.73	59	6,175												
Total	55,648	11,721	67,369	40,452	6,706,707	0.73	121	25,283												



TABLE #4

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP AND NUMBER OF WORKING IN THE SUGAR PINE REGION - 1942

Land Ownership	Status of Ribes Eradication										Total All Workings			
	First Working					Second Working					Third Working			
	Acres Worked	8-Hour Man	Days	Ribes Eradicated	Acres Worked	8-Hour Man	Days	Ribes Eradicated	Acres Worked	8-Hour Man	Days	Ribes Eradicated	Acres Worked	8-Hour Man
California														
National Forest	9,859	8,460	1,644,540	1,465	562	115,993	4,733	3,155	756,180	1,121	422	32,048	1,930	531
National Park	13,189	9,832	1,201,758	346	585	92,130	4,733	3,155	756,180	1,121	422	32,048	1,930	531
Subtotal - Federal	23,048	18,292	2,846,298	1,811	1,147	208,123	9,466	6,310	1,512,360	2,242	844	64,096	3,860	1,062
Private	10,914	8,842	1,638,936	9,851	3,497	637,172	2,735	1,200	292,763	230	108	10,500	290	55
State				895		20,616	155		1,187				1,050	446
Total	33,962	27,134	4,485,234	12,557	5,049	865,911	7,623	4,336	1,050,430	1,351	530	42,548	2,220	586
Oregon														
National Forest	4,665	828	37,802	1,342	873	134,580	168	89	14,766				6,175	1,790
O & C Revested Lands Admin.	3,441	56	34,550										3,441	856
Subtotal - Federal	8,106	1,384	72,352	1,342	873	134,580	168	89	14,766				9,616	2,646
Private				2,877									40	111
Total	8,146	1,795	74,829	1,342	873	134,580	168	89	14,766				9,656	2,757
Sugar Pine Region														
National Forest	14,524	9,288	1,682,342	2,807	1,435	250,573	4,901	3,244	771,246	1,121	422	32,048	1,930	531
National Park	13,189	9,832	1,201,758	346	585	92,130	4,733	3,155	756,180	1,121	422	32,048	1,930	531
O & C Revested Lands Admin.	3,441	56	34,550										3,441	856
Subtotal - Federal	31,154	19,976	2,918,650	3,153	2,020	342,703	4,901	3,244	771,246	1,121	422	32,048	1,930	531
Private	10,954	8,953	1,641,813	9,851	3,497	637,172	2,735	1,200	292,763	230	108	10,500	290	55
State				895		20,616	155		1,187				1,050	446
Grand Total	42,108	28,929	4,560,463	13,893	5,922	1,000,491	7,791	4,445	1,065,196	1,351	530	42,548	2,220	586

TABLE #5

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP AND NUMBER OF WORKING IN THE SUGAR PINE REGION - 1955-1942

Land Ownership	Status of Ribes Eradication										Total All Workings			
	First Working					Second Working					Third Working			
	Acres Worked	8-Hour Man	Days	Ribes Eradicated	Acres Worked	8-Hour Man	Days	Ribes Eradicated	Acres Worked	8-Hour Man	Days	Ribes Eradicated	Acres Worked	8-Hour Man
California														
National Forest	279,062	213,009	46,638,247	139,569	75,971	13,859,592	23,664	12,983	2,931,061	5,837	2,742	173,223	3,228	875
National Park	81,895	102,047	14,697,353	8,212	12,107	2,297,057	23,664	12,983	2,931,061	5,837	2,742	173,223	3,228	875
Subtotal - Federal	360,957	315,056	61,335,600	147,781	88,078	16,156,649	47,328	25,966	5,862,122	11,674	5,484	346,446	6,456	1,750
Private	308,101	190,768	46,911,600	133,351	73,920	7,183,692	5,891	2,725	457,364	577	155	12,498	290	55
State	4,797	3,102	51,280	1,110	431	29,408	155	41	1,187				6,062	3,574
Total	673,855	508,926	108,298,480	282,242	162,429	23,966,449	53,774	28,732	6,040,673	12,251	5,639	358,944	6,746	1,805
Oregon														
National Forest	83,082	47,073	15,291,795	21,945	6,478	911,529	727	376	34,705				105,754	53,927
National Park	3,632	412	130,162	350	81	1,130							3,982	493
O & C Revested Lands Admin.	33,524	370,744	603,170	8,203									33,524	8,203
Subtotal - Federal	120,238	55,688	16,025,127	22,295	6,559	924,959	727	376	34,705				143,266	62,623
Private	103,185	14,519	1,722,251	12,192	1,853	172,531							115,971	16,372
State	712	217	10,800										712	217
Total	224,135	70,424	17,758,178	34,487	8,412	1,097,490	727	376	34,705				259,949	79,212
Sugar Pine Region														
National Forest	362,144	260,082	61,930,042	151,514	82,449	14,771,521	24,381	13,359	3,028,766	5,837	2,742	173,223	3,228	875
National Park	81,895	102,047	14,697,353	8,212	12,107	2,297,057	23,664	12,983	2,931,061	5,837	2,742	173,223	3,228	875
O & C Revested Lands Admin.	3,441	56	34,550										3,441	856
Subtotal - Federal	447,480	364,185	76,661,945	162,736	94,556	17,068,638	48,445	26,342	6,890,827	11,674	5,484	346,446	6,456	1,750
Private	411,886	205,287	48,536,851	145,543	75,713	7,956,223	5,891	2,725	457,364	577	155	12,498	290	55
State	5,509	3,119	528,080	1,110	431	29,408	155	41	1,187				6,062	3,574
Grand Total	898,590	579,350	126,525,556	316,729	170,841	25,065,659	54,437	28,732	7,441,558	12,251	5,639	358,944	6,746	1,805

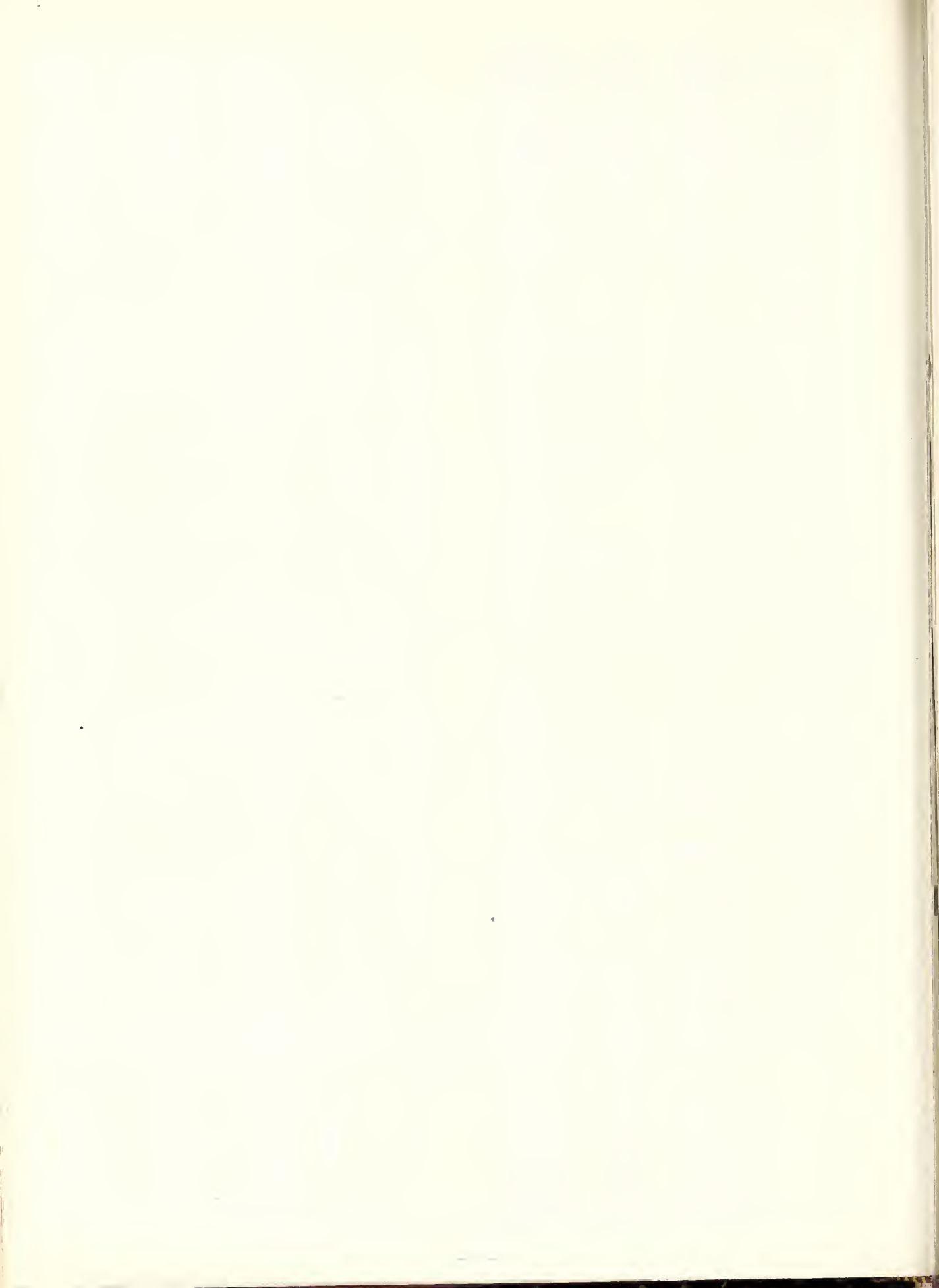


TABLE 6

THE DISTRIBUTION OF CAMPS IN THE SUGAR PINE REGION DURING 1942

Control Operation	Agency and Fund	County	Number and Average Size of Camps	Approximate Period of Operation	Location
Oregon					
Siuslaw	O&C - CCC	Coos	1 - 20	June 1 - June 30	McKinley Nursery
Siskiyou	O&C - Reg.	Josephine	1 - 40	June 1 - Sept. 10	Soldier Camp
Rogue	FS - Reg.	Jackson	1 - 20	June 20 - Sept. 20	Union Creek
California					
Klamath	FS - Reg.	Siskiyou	2 - 40	June 1 - Oct. 15	Hungry Creek & Beaver Creek
	EQ - Reg.	Shasta	1 - 20	May 20 - Sept. 10	Viola
Lassen	EQ - Reg.	Tehama	1 - 40	May 20 - Sept. 10	Soda Springs
	FS - Reg.	Plumas	1 - 70	May 25 - Sept. 15	Granite Basin
Plumas	FS - Reg.	Plumas	1 - 20	Sept. 15 - Oct. 20	Feather River
	FS - Reg.	Butte	1 - 40	May 25 - Sept. 15	Merrimac
	EQ - Reg.	Plumas	1 - 50	June 10 - Sept. 10	Cascade
Eldorado	EQ - Reg.	Eldorado	2 - 35	June 1 - Sept. 15	Davis Cabin & Camp 12
	FS - Reg.	Tuolumne	1-33 - 1-20	June 1 - Sept. 30	Bumble Bee & Wood's Ridge
Stanislaus	EQ - Reg.	Calaveras	1 - 20	June 25 - Sept. 10	Calaveras Big Trees
Sierra	FS - Reg.	Mariposa	2 - 40	June 1 - Sept. 30	Summit & Miami
	NPS - Reg.	Tuolumne	1 - 35	July 1 - Aug. 31	Crane Flat
Yosemite N. P.	NPS - Reg.	Mariposa	1 - 90	May 1 - Sept. 30	Yosemite Valley
Sequoia N. P.	NPS - Reg.	Tulare	2 - 35	June 10 - Sept. 30	Red Fir

Table 7

SUMMARY OF REGULAR, ADVANCE, AND POST CHECKING IN THE SUGAR PINE REGION - 1942

Operation	Regular Check			Advance Check			Post Check	
	Acres Covered By Final Check	Percent of Check	Man Days	Acres Covered	Percent of Check	Man Days	Acres Covered	Percent of Check
Oregon								
Rogue River	1,330	4.8	27 4/8				5,331	4.6
Siskiyou	2,081	6.1	79 1/8	6,536	5.4	125 7/8		
Total	3,411	5.6	106 5/8	6,536	5.4	125 7/8	5,331	4.6
California								
Klamath	5,892	4.7	171 6/8	12,850	3.4	156 1/8		
Plumas - Lassen	10,573	5.1	233 3/8	3,295	3.7	55 6/8	10,436	4.0
Stanislaus - Eldorado	14,483	4.5	351	6,030	2.9	78	9,163	3.8
Sierra	3,549	5.0	76 2/8	300	2.1	3 7/8	5,240	3.9
Yosemite N. P.	8,855	4.8	167 4/8	6,419	4.1	111 3/8		
Sequoia N. P.	1,443	4.8	41 5/8				3,084	4.1
Total	44,795	4.8	1041 4/8	28,894	3.5	405 1/8	27,923	3.9
Sugar Pine Region								
Total	48,206	4.8	1148 1/8	35,430	3.8	531	33,254	4.0
								523 2/8

Table 8

ANALYSIS OF CHECKING COST AND PRODUCTION IN THE SUGAR PINE REGION - 1942

Operation	Class of Check	Man Days		Strip Acres	Strip Acres per Checker		Total Cost	Cost Per Acre Basis		Cost per Strip Acre		
		Number	Per cent of Total Checker Man Days		Checker	Man Day		Checker	Man Day		Acres Covered by Check	
Oregon												
Rogue River	Regular	27	22.5	81.0	3.1	3.4	\$ 210.20	\$.158	\$	2.60		
	Post	81	67.4	243.8	3.0	3.4	625.84	.117		2.57		
	All --	109	90.0	324.8	3.0	3.4	836.04	.126		2.57		
Siskiyou	Regular	79	35.9	182.2	2.3	2.9	550.01	.264		3.02		
	Advance	125	57.1	351.7	2.8	3.5	874.98	.134		2.49		
	All --	205	93.0	533.9	2.6	3.3	1,424.99	.155		2.67		
Total	Regular	106	31.2	263.2	2.5	3.0	760.21	.223		2.89		
	Advance	125	36.8	351.7	2.8	3.5	874.98	.134		2.49		
	Post	81	24.0	243.8	3.0	3.4	625.84	.117		2.57		
	All --	314	92.0	858.7	2.7	3.3	2,261.03	.148		2.63		
California												
Klamath	Regular	171	44.9	401.8	2.4	2.8	1,294.58	.219		3.22		
	Advance	156	40.9	440.4	2.9	3.4	1,176.81	.092		2.67		
	All --	327	85.8	842.2	2.7	3.1	2,471.39	.132		2.93		
Plumas-Lassen	Regular	233	47.8	568.4	2.4	2.6	1,713.46	.162		3.01		
	Advance	55	11.4	120.7	2.2	2.3	409.32	.124		3.39		
	Post	180	36.9	419.7	2.3	2.5	1,322.50	.127		3.15		
	All --	469	96.1	1,108.8	2.4	2.5	3,445.28	.142		3.11		
Stanislaus-Eldorado	Regular	351	58.5	855.3	2.4	2.7	2,680.01	.185		3.13		
	Advance	78	13.0	172.2	2.2	2.4	595.55	.099		3.46		
	Post	130	21.7	352.4	2.7	3.0	992.59	.108		2.82		
	All --	559	93.2	1,379.9	2.4	2.7	4,268.16	.144		3.09		

*On the Rogue River Operation 90 per cent of the effective man days were spent on checking and 10 per cent on other activities related to checking (See Table 3). Corresponding percentage figures hold true for other operations.

Table 3 (Continued)

ANALYSIS OF CHECKING COST AND PRODUCTION IN THE SUGAR PINE REGION - 1942

Operation	Class of Check	Man Days		Strip Acres	Strip Acres per Checker Man Day	Strip Acres per Checker Field Man Day	Total Cost	Cost Per Acre Basis Acres Covered by Check	Cost per Strip Acre
		Number	Per cent of Total Checker Man Days						
California (Continued)									
Sierra	Regular	76	35.5	182.2	2.4	3.0	\$ 575.77	\$.162	\$ 3.16
	Advance	3	1.3	6.3	1.6	2.1	29.26	.098	4.64
	Post	98	45.8	204.1	2.1	2.7	741.89	.142	3.63
	All - -	178	83.1	392.6	2.2	2.8	1,346.92	.148	3.43
Yosemite N. P.	Regular	167	49.1	465.4	2.8	3.5	1,264.81	.143	2.72
	Advance	111	32.6	261.5	2.3	3.0	841.00	.131	3.22
	All - -	278	81.7	726.9	2.6	3.3	2,105.81	.138	2.90
Sequoia	Regular	41	48.8	96.0	2.3	2.9	314.31	.218	3.27
	Post	33	38.7	126.2	3.8	4.9	249.19	.081	1.97
	All - -	74	87.5	222.2	3.0	3.8	563.50	.124	2.54
Total	Regular	1,041	49.3	2,569.1	2.5	2.8	7,842.94	.175	3.05
	Advance	405	19.2	1,001.1	2.5	2.9	3,051.95	.106	3.05
	Post	441	20.9	1,102.4	2.5	2.8	3,306.17	.118	3.00
	All - -	1,888	89.4	4,672.6	2.5	2.8	14,201.06	.140	3.04
Sugar Pine Region									
Total	Regular	1,148	46.8	2,832.3	2.5	2.9	8,603.15	.178	3.04
	Advance	531	21.7	1,352.8	2.5	3.1	3,926.93	.111	2.90
	Post	523	21.3	1,346.2	2.6	2.9	3,932.01	.113	2.92
	All - -	2,202	89.8	5,531.3	2.5	2.9	\$16,462.09	\$.141	\$ 2.93

TABLE #9

ANALYSIS OF CHECKING TIME DEVOTED TO OTHER ACTIVITIES IN THE SUGAR PINE REGION - 1942

Operation	Eradication		Section Line Control		Fire		Total		Per cent of Total Checker Man Days
	Man Days	Total Cost	Man Days	Total Cost	Man Days	Total Cost	Man Days	Total Cost	
Oregon									
Rogue River	-	-	11 2/8	\$ 85.99	7/8	\$ 6.69	12 1/8	\$ 92.68	10.0
Siskiyou	3 5/8	\$ 25.20	11 7/8	82.55	-	-	15 4/8	107.75	7.0
Total	3 5/8	25.20	23 1/8	168.54	7/8	6.69	27 5/8	200.43	8.0
California									
Klamath	13 4/8	101.76	40 5/8	306.21	-	-	54 1/8	407.97	14.2
Plumas-Lassen	-	-	14 2/8	104.63	5	36.71	19 2/8	141.34	3.9
Stanislaus-Eldorado	18 4/8	141.25	18 5/8	142.21	4	30.54	41 1/8	314.00	6.8
Sierra	18 7/8	142.53	10 5/8	80.23	6 6/8	50.97	36 2/8	273.73	16.9
Yosemite N. P.	25	188.78	27 4/8	207.65	10	75.51	62 4/8	471.94	18.3
Sequoia N. P.	3	22.65	6 5/8	50.03	1	7.55	10 5/8	80.23	12.5
Total	78 7/8	596.97	118 2/8	890.96	26 6/8	201.28	223 7/8	1,689.21	10.6
Sugar Pine Region									
Total	82 4/8	\$ 622.17	141 3/8	\$1,059.50	27 5/8	\$ 207.97	251 4/8	\$1,889.64	10.2

TABLE #10

ANALYSIS OF ALL REGULAR CHECKING IN THE SUGAR PINE REGION - 1942

Operation	Number of Check									
	First			Rechecks			All Regular Checks			
	Man Days	Acres	Total Cost	Cost Per Acre	Man Days	Acres	Total Cost	Cost Per Acre	Man Days	Acres
Oregon										
Rogue River	22 4/8	1,330	\$ 171.98	\$.129	5	331	\$ 38.22	\$.115	27 4/8	1,661
Siskiyou	55 5/8	2,081	386.66	.186	23 4/8	716	163.35	.228	79 1/8	2,797
Total	78 1/8	3,411	558.64	.164	28 4/8	1,047	201.57	.193	106 5/8	4,458
California										
Klamath	115 5/8	5,892	871.53	.148	56 1/8	2,575	423.05	.164	171 6/8	8,467
Plumas-										
Lassen	219	10,573	1,607.92	.152	14 3/8	660	105.54	.160	233 3/8	11,233
Stanislaus-										
Eldorado	270 7/8	14,878	2,068.21	.139	80 1/8	3,996	611.78	.153	351	18,874
Sierra	74 3/8	3,549	561.61	.158	1 7/8	60	14.16	.236	76 2/8	3,609
Yosemite N. P.	148 6/8	8,855	1,123.23	.127	18 6/8	891	141.58	.159	167 4/8	9,746
Sequoia N. P.	29 3/8	1,443	221.81	.154	12 2/8	546	92.50	.169	41 5/8	1,989
Total	858	45,190	6,454.31	.143	183 4/8	8,728	1,338.61	.159	1,041 4/8	53,918
Sugar Pine Region										
Total	936 1/8	48,601	\$7,012.95	\$.144	212	9,775	\$1,590.18	\$.163	1,148 1/8	58,376
										\$8,603.15
										\$.147

OMNIBUS TABLES

Table 5 - Summary of Expenditures for 1942, and Table 6A, Summary of All Expenditures 1918-1942, will be found in the Section "Financial Statements", page 17.

The several divisions of Tables 3 and 3A summarizing Ribes eradication by Agency have been placed in the corresponding parts of the report as follows:

Table 4A - Sheet 3 and 4 - Summary of Ribes Eradication on National Park Land 1933-1942 (See Part V - page 72)

Table 3 - Sheet 5 - Summary of Ribes Eradication on National Forest Land 1942 (See Part IV - page 63)

Table 4A - Sheets 9 and 10 - Summary of Ribes Eradication on National Forest Land - 1925-1942 (See Part IV - page 63)

Table 4A - Sheets 11 and 12 - Summary of Ribes Eradication on Oregon and California Revested Lands 1925-1942
(See Part VI - page 79)

Table 3 - Sheet 4 - Summary of Ribes Eradication on State and Private Lands 1942 (See Part III - page 54)

Table 4A - Sheets 7 and 8 - Summary of Ribes Eradication on State and Private Lands 1925-1942 (See Part III - page 54)



OMNIBUS TABLE #1

SUMMARY OF 1942 RIBES ERADICATION

State	Initial Eradication Work				Reeradication Work				Totals		Ribes Per Acre		Man Days Per Acre		Number of C.C.C.		Number of Employees			
	Acreage Worked	Number Wild & Cultivated Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Wild & Cultivated Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Wild & Cultivated Ribes Destroyed	Number 8-Hour Man Days	Initial Eradication	Reeradication	Initial Eradication	Reeradication	C.C.C. & S.C.S.	Total	Regular	Total	All Supervision Employees	Total	870
California	33,962	4,485,274	27,134	23,751	1,997,298	10,561	57,713	6,482,532	37,695	160	84	0.97	0.44	-	19	800	800	70	870	
Oregon	8,146	74,829	1,795	1,510	149,346	962	9,656	224,175	2,757	33	99	0.79	0.64	1	2	70	90	8	98	
Total - -	42,108	4,560,053	28,929	25,261	2,146,644	11,523	67,369	6,706,707	40,452	193	85	0.95	0.46	1	21	870	890	78	968	

OMNIBUS TABLE #1A

SUMMARY OF ALL RIBES ERADICATION 1925-1942 (INCLUSIVE)

State	Initial Eradication Work				Reeradication Work				Initial and Reeradication				Per Acre			
	Gross Acreage Reported Initially Worked	Net Acreage Reported In Control Area	Number 8-Hour Man Days	Number Wild & Cultivated Ribes Destroyed	Gross Acreage Reported Reworked	Net Acreage Reported In Control Area	Number 8-Hour Man Days	Number Wild & Cultivated Ribes Destroyed	Gross Initial and Reworked Acreage Reported	Initial and Reworked Net Acreage	Number 8-Hour Man Days	Number Wild & Cultivated Ribes Destroyed	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.
California	673,855	673,855	108,767	480	508,926	321,874	321,874	27,660,684	995,729	995,729	690,931	163	86	0.76	0.57	
Oregon	227,344	224,735	17,758	178	70,424	35,214	35,214	1,132,195	264,284	253,949	79,212	78	31	0.31	0.24	
Total - -	901,199	898,590	126,525	658	579,350	357,088	357,088	28,792,879	1,260,013	1,255,678	770,143	140	80	0.64	0.53	



OMNIBUS TABLE #2

SUMMARY OF 1942 RIBES ERADICATION BY PROGRAMS*
(Including all work - Initial and Reeradication)

State	Regular and Cooperative**				C.C.C. and S.C.S.		
	Acreage Worked	Number Wild & Cultivated Ribes Destroyed	Number 8-Hour Men Days	Acreage Worked	Number Wild & Cultivated Ribes Destroyed	Number 8-Hour Men Days	Number 8-Hour Men Days
California	57,713	6,482,532	37,695				
Oregon	9,576	218,421	2,535	80	5,754	222	
Total --	67,289	6,700,953	40,230	80	5,754	222	

*This includes work of Bureau, cooperating State and private agencies, Forest Service and Interior Department work with regular funds.

**No WPA work in the Sugar Pine Region in 1942

OMNIBUS TABLE #3A

SUMMARY OF ALL RIBES ERADICATION BY PROGRAMS 1925-1942 (INCLUSIVE)
(Initial and Reeradication)

State	Regular and Cooperative*			W.P.A. and F.R.A.			C.C.C. and S.C.S.			P.W.A. or N.R.A.			Total Emergency Program (W.P.A. - C.C.C. - P.W.A.)		
	Acreage Worked	Number Wild & Cultivated Ribes Destroyed	Number 8-Hour Men Days	Acreage Worked	Wild & Cultivated Ribes Destroyed	Number 8-Hour Men Days	Acreage Worked	Wild & Cultivated Ribes Destroyed	Number 8-Hour Men Days	Acreage Worked	Wild & Cultivated Ribes Destroyed	Number 8-Hour Men Days	Acreage Worked	Wild & Cultivated Ribes Destroyed	Number 8-Hour Men Days
California	230,346	19,389,959	102,802	412,434	69,870,817	316,770	143,795	25,782,037	198,480	209,154	21,385,351	72,879	766,383	117,038,205	588,129
Oregon	17,883	564,465	5,613	206,211	15,538,844	63,096	7,510	360,032	2,864	28,345	2,427,032	7,609	242,066	18,325,908	73,569
Total - -	248,229	19,954,424	108,415	618,645	85,409,661	379,866	151,305	26,142,069	201,344	237,499	23,812,383	80,488	1,008,449	135,364,113	661,698

*This includes work of the Bureau, cooperating State and private agencies, Forest Service and Interior Department work with regular funds.



OMNIBUS TABLE #2A
STATUS OF BLISTER RUST CONTROL, 1925-1942 (INCLUSIVE)

State	Acreage of Net Control Area White Pine In	Acreage of Net Control Area (White Pine and Protection Zones)	Acreage of Net Control Area Initially Worked	Acreage of Net Control Area Reworked		Percentage Net Control Area		Acreage In Net Control Area Still Needing Initial Protection	Acreage In Net Control Area Now On Maintenance Basis *
				1st Rework	Other Reworkings	Initially Worked	1st Rework		
California	2,004,527	2,004,527	673,855	282,242	39,632	33.6	14.1	1,330,672	278,556
Oregon	526,793	526,793	224,735	34,487	727	42.7	6.5	302,058	112,761
Total - -	2,531,320	2,531,320	898,590	316,729	40,359	35.5	12.5	1,632,730	391,417

*Maintenance - Any area on which the Ribes are so scarce that danger from blister rust is negligible for an indefinite period. To assure the continuation of this safe condition requires periodic examinations and in some instances Ribes eradication by scouting methods.



CONTINUED TABLE #3
SUMMARY OF RIBES BRADIATION BY LAND OWNERSHIP - 1942

Land Ownership	Initial Eradication			Reeradication			Totals		
	Acreage Worked	Number Ribes Destroyed	Number g-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number g-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number g-Hour Man Days
National Forests	14,524	1,682,342	9,288	10,759	1,089,569	5,632	25,283	2,772,011	14,920
O & C Revested Lands* (State of N.F. only)	3,441	34,150	856	-	-	-	3,441	34,150	856
National Parks	13,189	1,201,758	9,832	346	92,130	585	13,535	1,293,888	10,417
Subtotal Federal -	31,154	2,918,250	19,976	11,105	1,181,799	6,217	42,259	4,100,049	26,193
State and Private	10,954	1,041,613	8,933	14,156	984,845	5,306	25,110	2,666,658	14,239
Grand Total - - -	42,108	4,560,063	28,909	25,261	2,166,644	11,523	67,369	6,766,707	40,432

*No separate table showing breakdown by forests has been made for O & C inasmuch as all work was done on one forest.

CONTINUED TABLE #4A
SUMMARY OF RIBES BRADIATION BY LAND OWNERSHIPS 1925-1942 (INCLUSIVE)

Land Ownership	Net Control Area		Initial Eradication			Reeradication Work			Totals		
	Acreage of White Pine In Net Control Area	Total Acreage (W.P. & Prot. Zones)	Net Acreage Worked In Control Area	Gross Acreage Reported Initially Worked	Gross Number Wild & Cultivated Ribes Destroyed	Gross Number g-Hour Man Days	Gross Acreage Reported Reworked	Net Acreage Reworked In Control Area	Gross Number Wild & Cultivated Ribes Destroyed	Gross Number g-Hour Man Days	Gross Number g-Hour Man Days
National Forests	1,109,399	1,109,399	747,255	365,123	61,330,042	260,082	196,726	194,960	18,027,105	99,425	359,507
O & C Revested Lands	129,709	129,709	96,185	33,524	603,170	8,203	-	-	-	-	8,203
National Parks	247,302	247,302	161,775	77,321	14,827,515	102,459	8,082	8,562	2,310,487	12,188	114,647
Subtotal Federal -	1,486,410	1,486,410	1,005,215	475,968	77,360,727	370,744	204,808	203,522	20,337,592	111,613	442,357
State and Private	1,044,910	1,044,910	627,515	425,231	49,164,931	208,606	154,006	153,566	8,455,287	79,180	287,766
Grand Total - - -	2,531,320	2,531,320	1,632,730	901,199	126,525,668	579,350	358,814	357,088	28,792,879	190,793	770,143



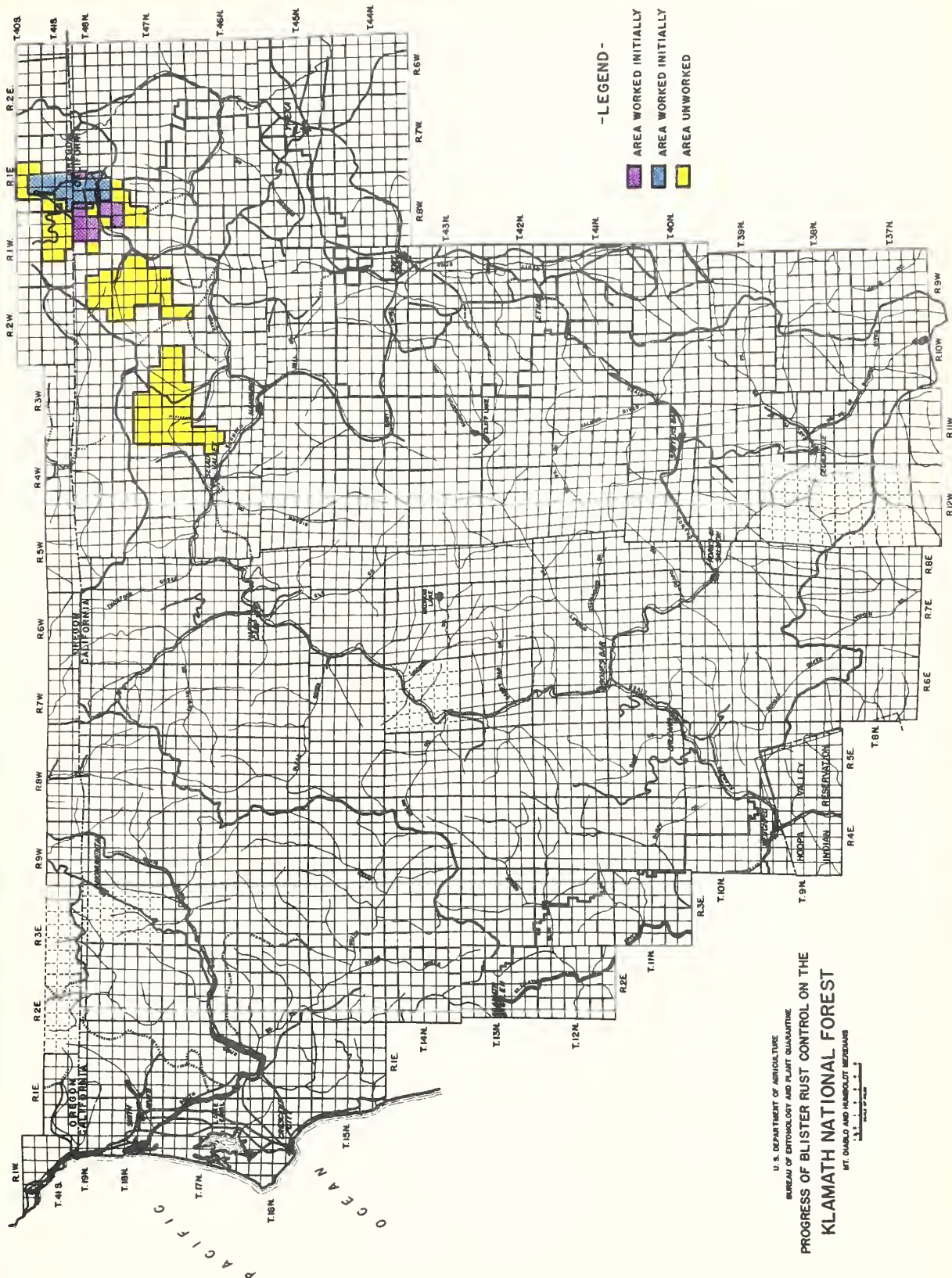
OMNIBUS TABLE #4
SUMMARY OF ALL OTHER CONTROL WORK FOR 1942

State	Nursery Sanitation				Mapping Control Areas			Treatment of Infected White Pines						Checking Post					
	Number Nurseries Worked	Number Acres Worked	Number Wild & Cultivated Ribes Destroyed	Number 8-Hour Men Days	Number Acres Mapped (W.P. & Prot. Zones)	Number 8-Hour Men Days	Total Number Pines Examined	Number Infected Pines	Number From Which Cankers Removed	Number Cankers Removed		Number 8-Hour Men Days	Advance	Number 8-Hour Men Days	Acres Checked	Number 8-Hour Men Days	Regular		
										Branch	Stem								
California							20,767	450	1,282	15,778	815	155	28,694	405	27,923	441	44,795	1,041	
Oregon	1	320,000	80	5,754	222	46,480	848	15,775	500	446	4,039	271	81	6,536	126	5,331	82	3,411	107
Total --	1	320,000	80	5,754	222	46,480	848	36,542	950	1,728	19,817	1,086	236	35,430	531	33,254	523	48,206	1,148

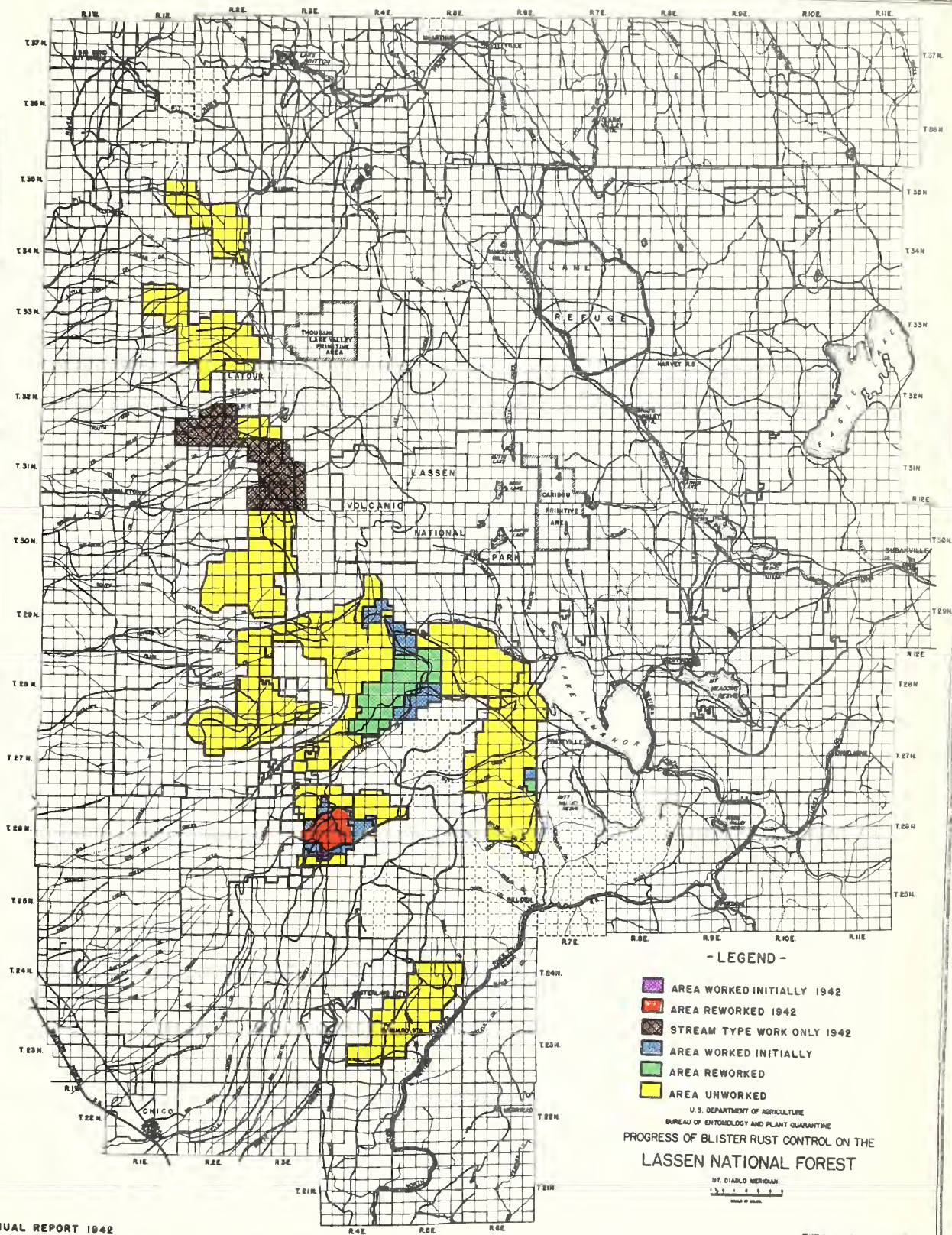
OMNIBUS TABLE #5A
SUMMARY OF ALL OTHER CONTROL WORK, 1925-1942 (INCLUSIVE)

State	Cultivated Black Currant Eradication				Nursery Sanitation				Mapping Control Areas			Treatment of Infected White Pines					
	Number Inspections Made	Number Locations Found	Number Black Currants Destroyed	Number 8-Hour Men Days	Sanitation Zone Maintained	Number Acres Worked		Number Wild & Cultivated Ribes Destroyed	Number 8-Hour Men Days	Number Acres Mapped (White Pine and Protection Zones)	Number 8-Hour Men Days	Total Number Pines Examined	Number Infected Pines	Number From Which Cankers Removed	Number Cankers Removed	Branch	Stem
						Number Nurseries Maintaining Zones	Total Acreage										
California	3,298	657	8,621	2,182	1	1	42	38	22	1,204,068	3,810	86,297	510	1,613	16,550	856	1,183
Oregon	No Data	1,671	52,202	No Data	4	4	1,936	27,568	993	407,729	2,823	22,781	762	485	4,235	272	367
Total --	3,298	2,328	60,823	2,182	5	5	1,978	27,606	1,015	1,611,797	6,633	109,078	1,272	2,098	20,785	1,128	1,750





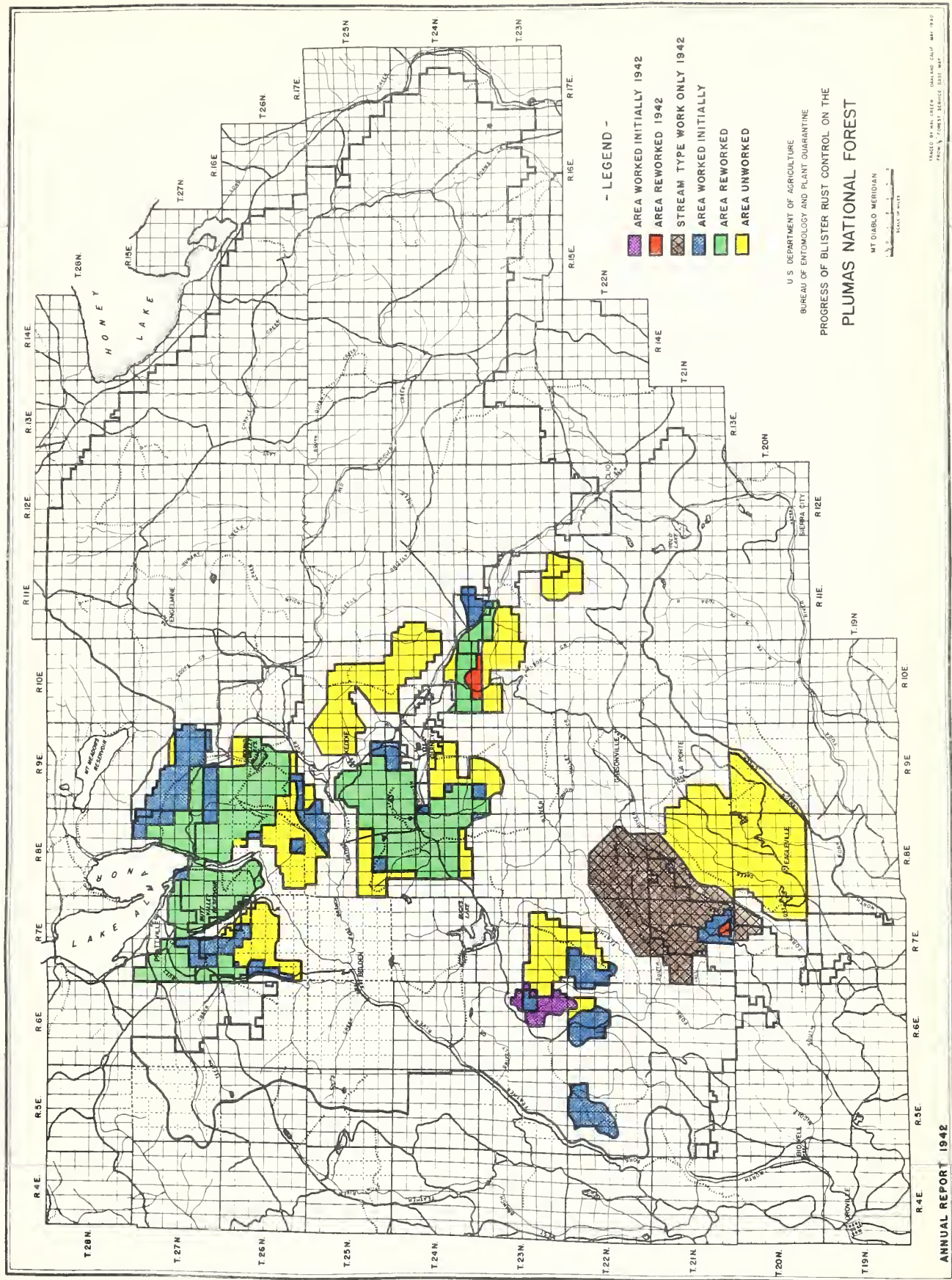




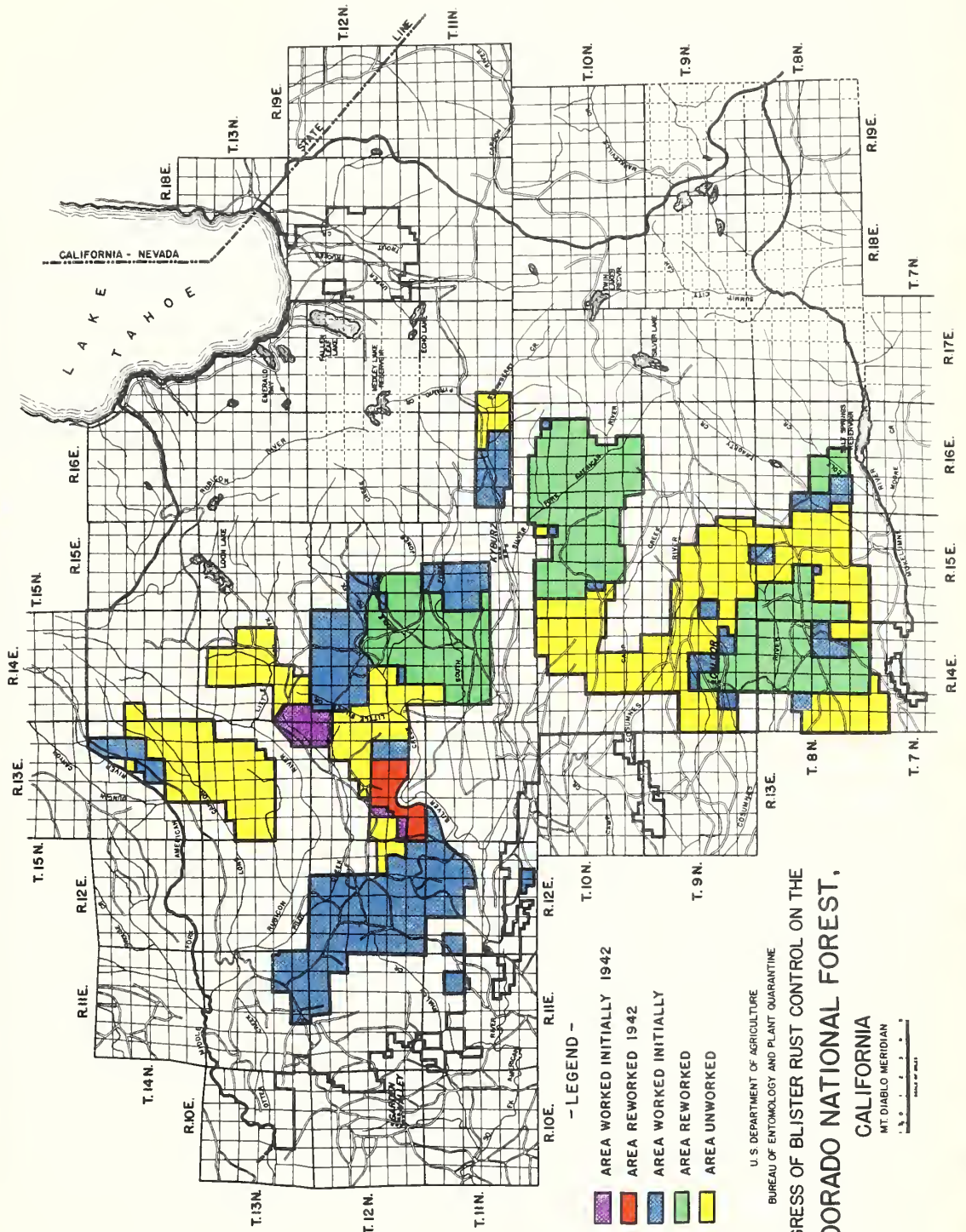
ANNUAL REPORT 1942

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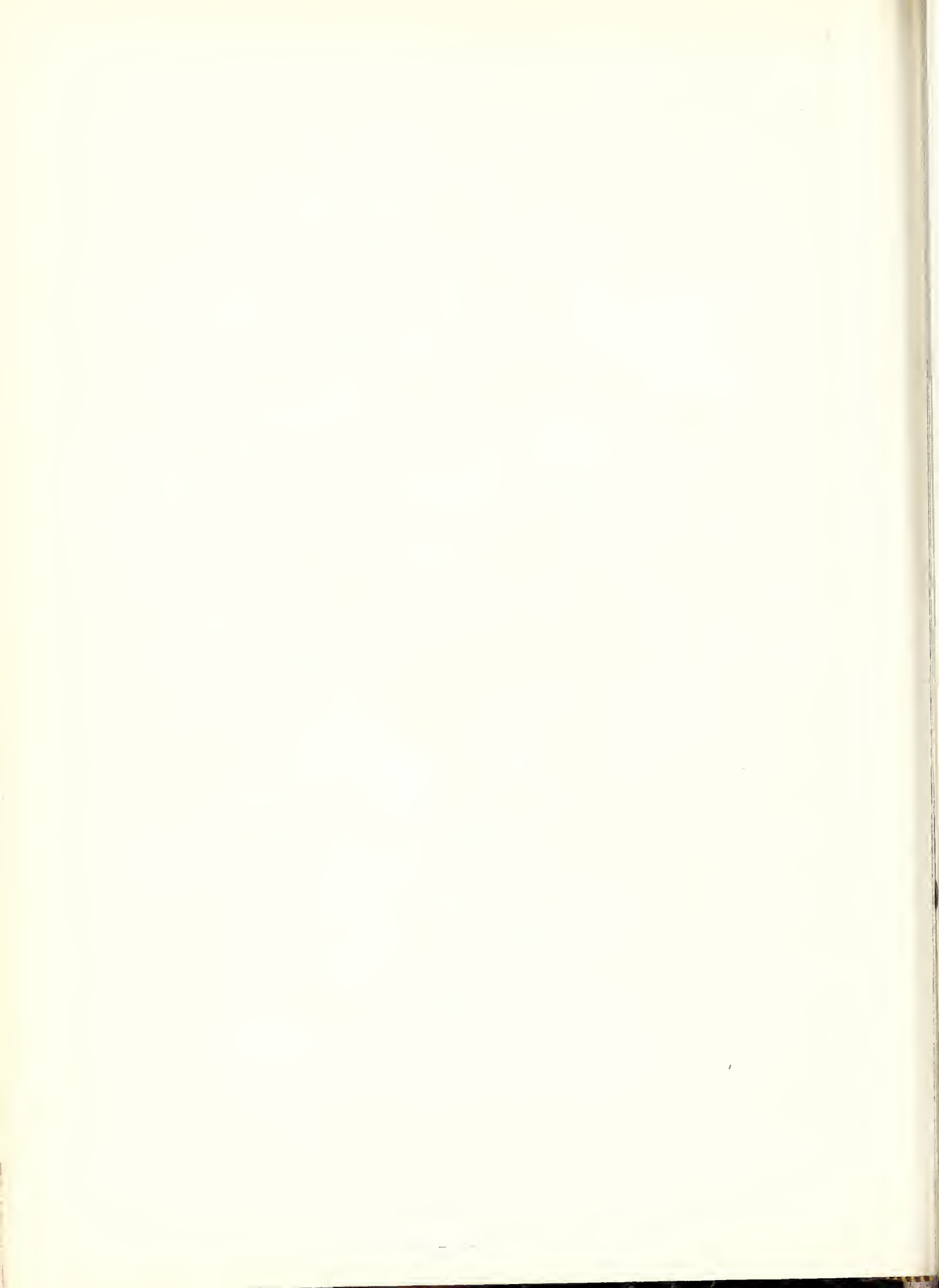
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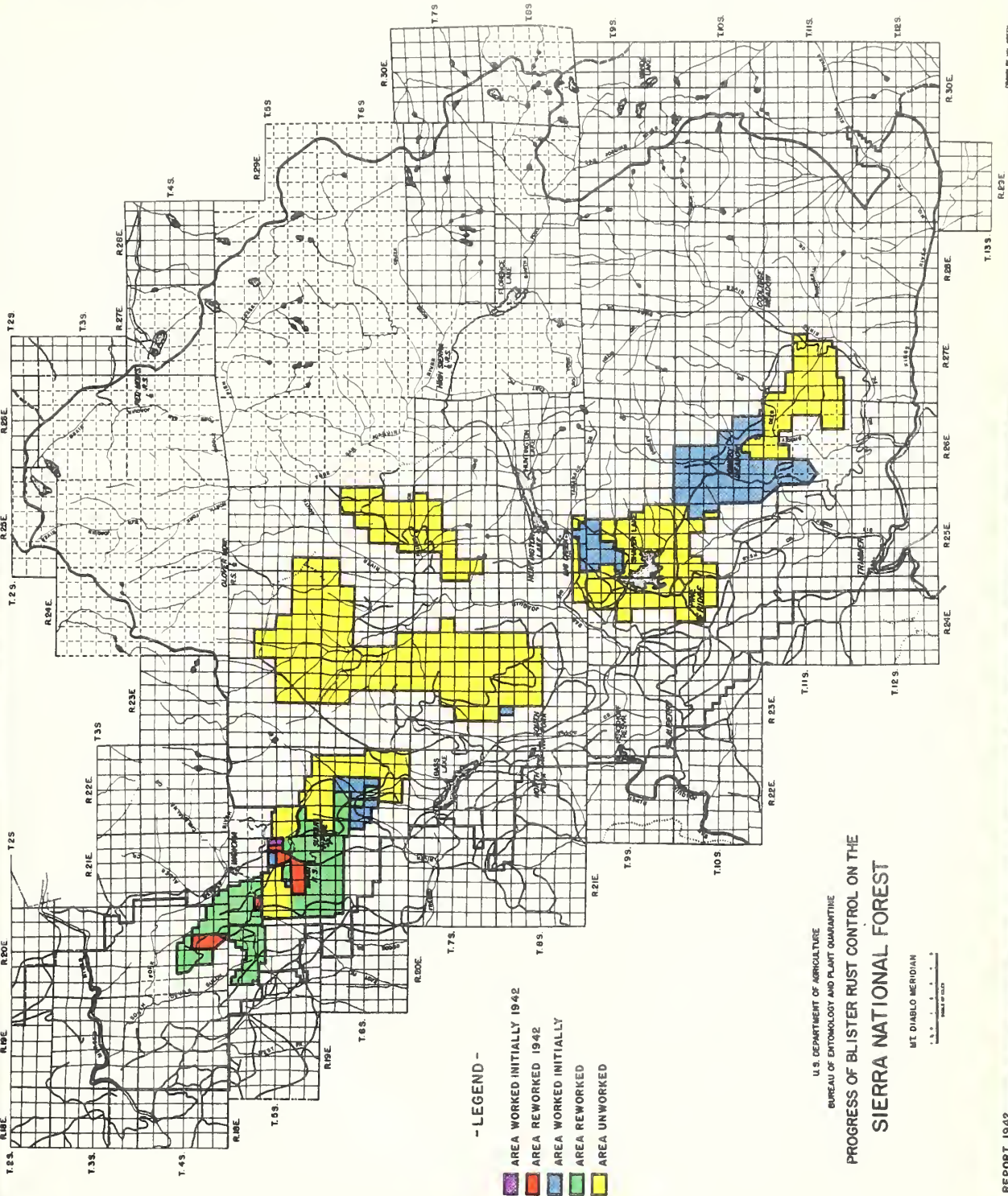
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 BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
 PROGRESS OF BLISTER RUST CONTROL ON THE
 ELDORADO NATIONAL FOREST,
 CALIFORNIA
 MT. DIABLO MERIDIAN









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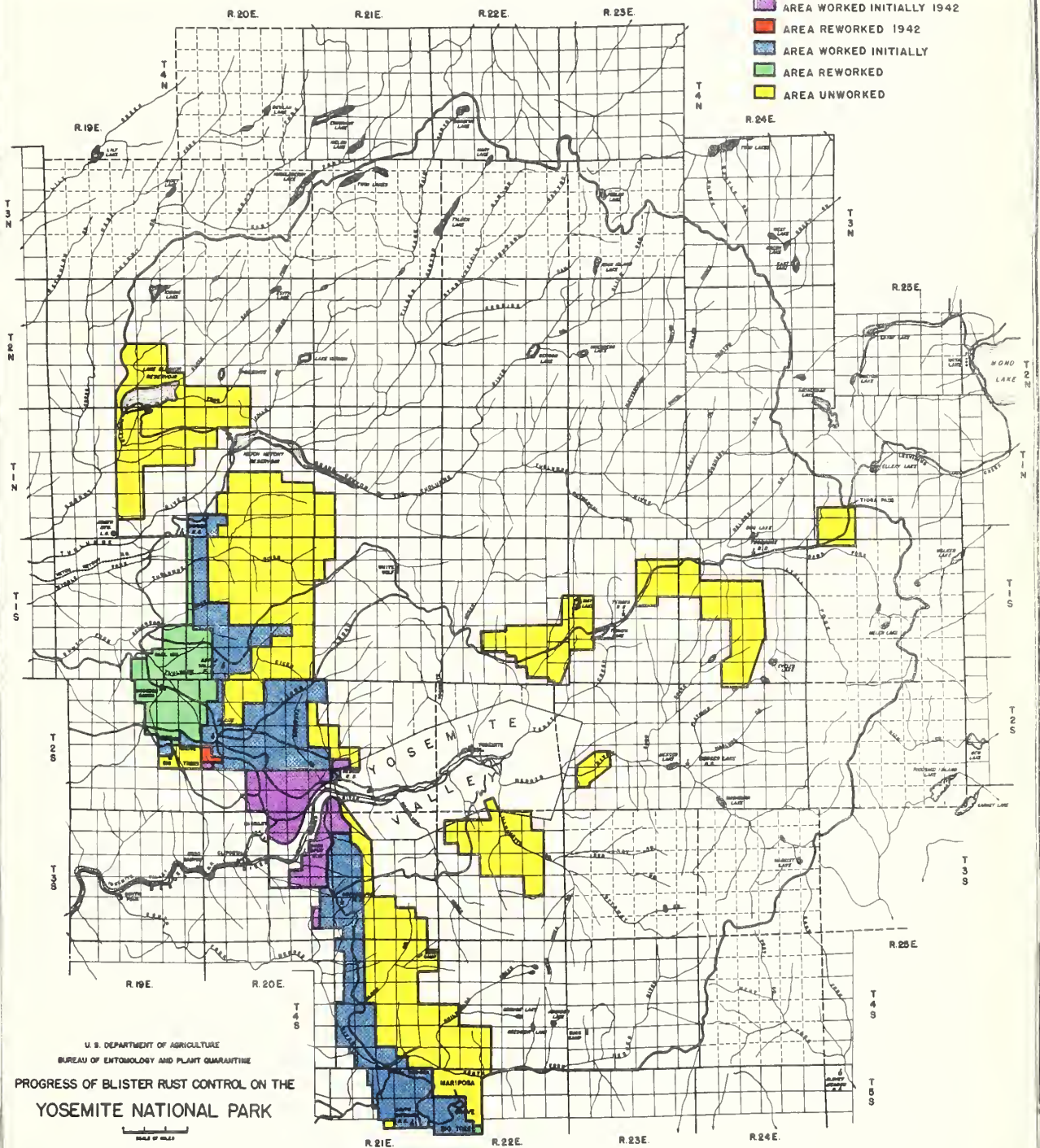
U.S. DEPARTMENT OF AGRICULTURE
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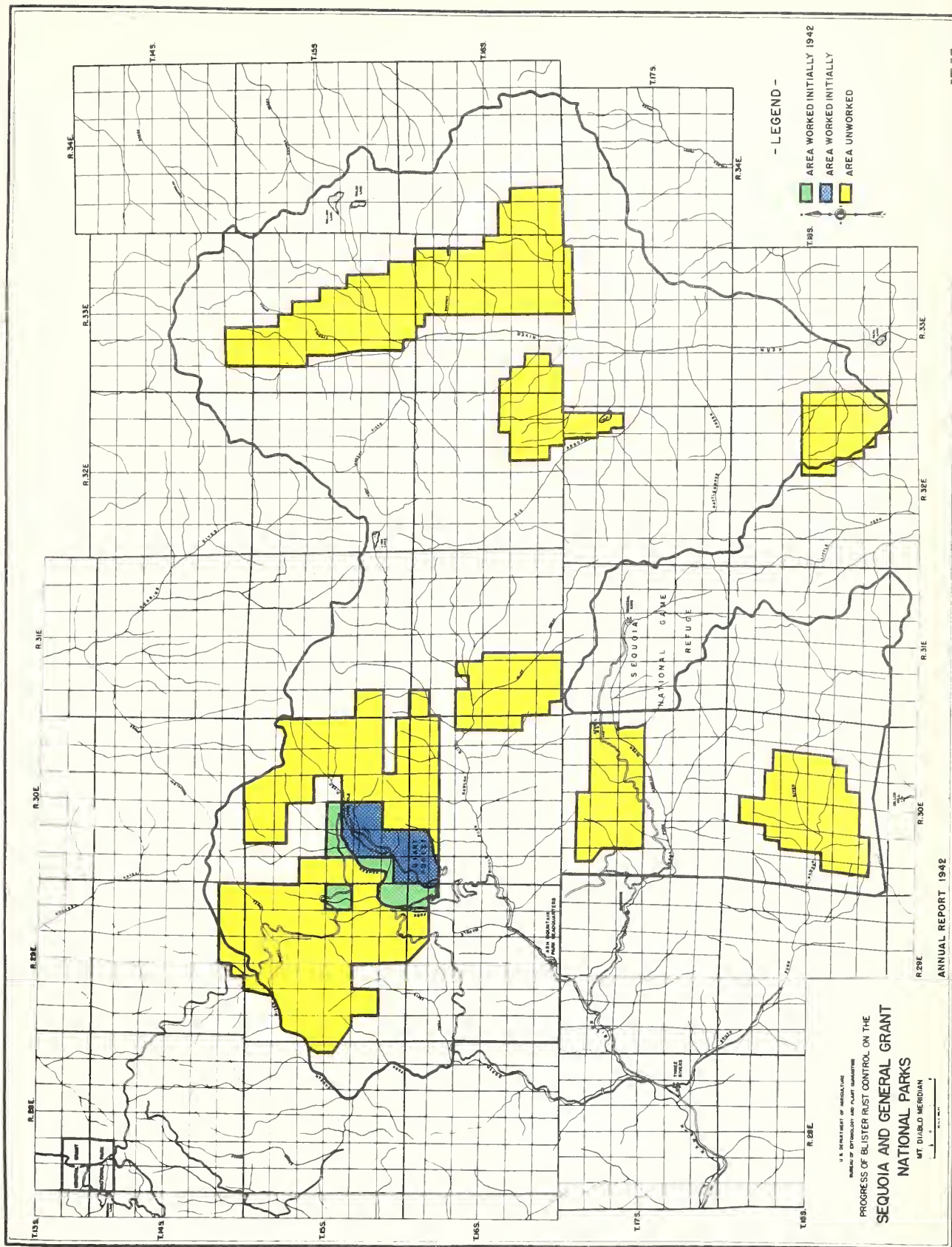


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PROGRESS OF BLISTER RUST CONTROL ON THE
YOSEMITE NATIONAL PARK

ANNUAL REPORT 1942

THIRD FROM NATIONAL PARK SERVICE MAP, 1938-1939
BY H. H. GREEN, OAKLAND, CALIFORNIA, SEP. 1940

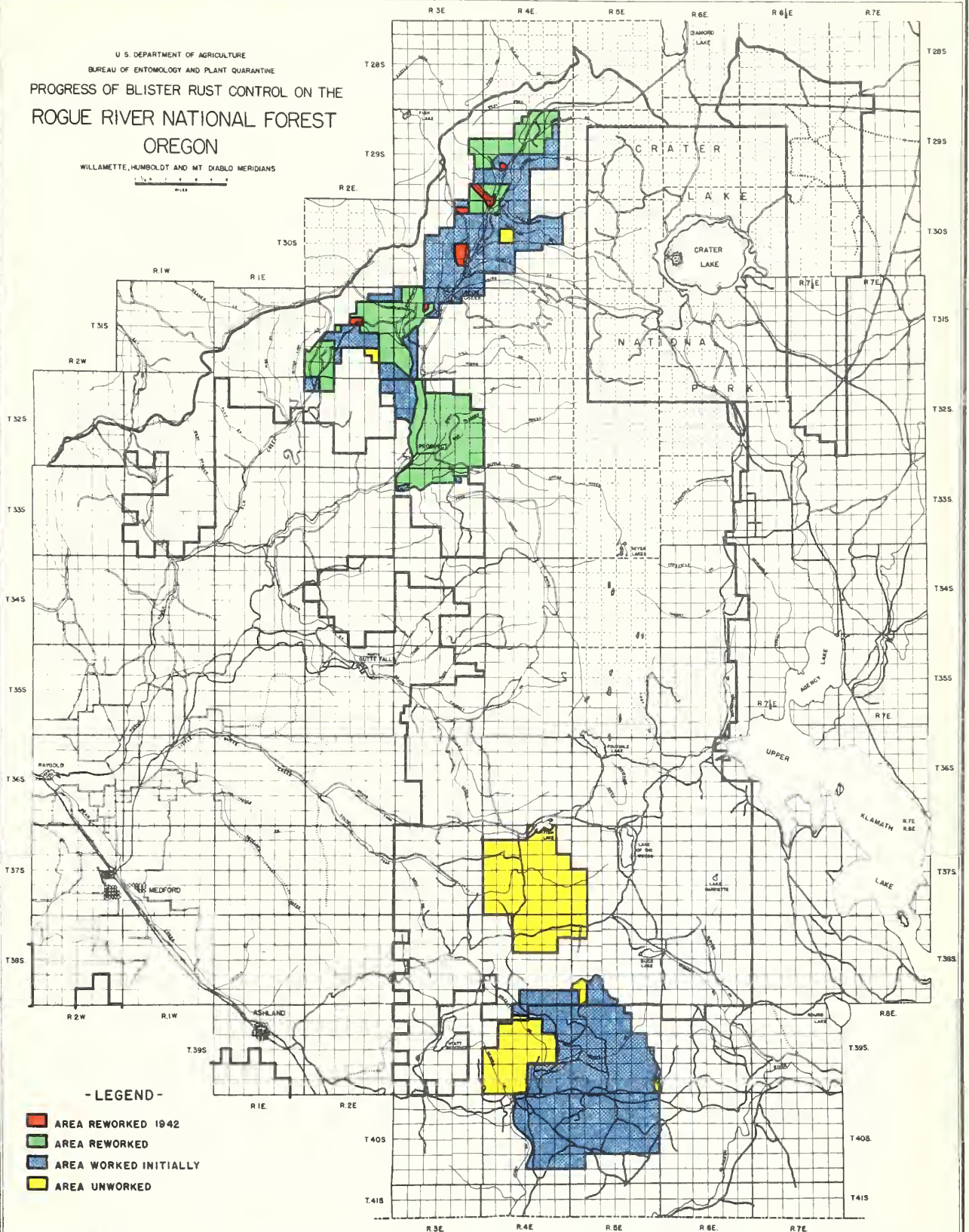






U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
ROGUE RIVER NATIONAL FOREST
OREGON

WILLAMETTE, HUMBOLDT AND MT. DIABLO MERIDIANS



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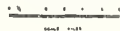
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ANNUAL REPORT 1942



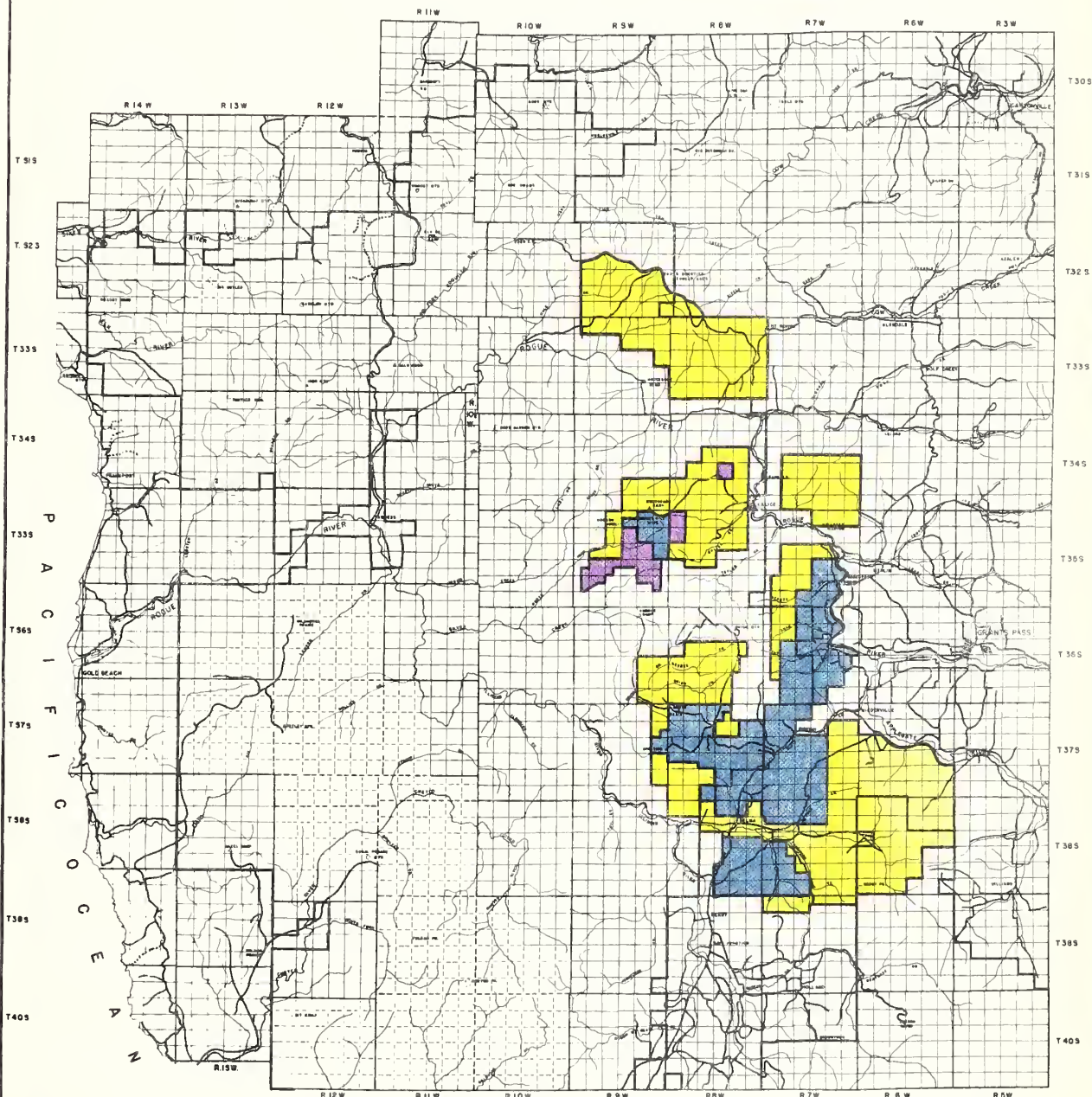
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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
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OREGON

WILLAMETTE AND HUMBOLOLT MEADOWS



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PART III

COOPERATIVE BLISTER RUST CONTROL ON STATE AND PRIVATELY OWNED LANDS WORK PROJECT BLR-3-5

By

Robert Sovulewski, Agent

OBJECTIVE

The purpose of this project is to control white pine blister rust by the eradication of Ribes on state and private lands in the sugar pine forests of California and Oregon. The project, financed cooperatively by the Federal government, the States, and other interested agencies both public and private, is operated under the leadership of the Bureau of Entomology and Plant Quarantine.

COOPERATORS

The Lea Act* authorizes the Secretary of Agriculture in cooperation with interested agencies to use funds made available for the control of white pine blister rust on state and private lands supporting white pine forests. Under this authority, the funds made available by the State of California and by three cooperating lumber companies in California were matched with funds appropriated for the Bureau of Entomology and Plant Quarantine in the Agricultural Appropriation Act of 1942 and allocated to the Oakland Office of Blister Rust Control. The Agricultural Appropriation Act assigned the task of leadership and coordination of the blister rust control program to the Bureau of Entomology and Plant Quarantine, and this office organized and conducted the cooperative control project in the Sugar Pine Region.

The State of California in 1941 appropriated \$50,000 for the control of white pine blister rust on state and privately owned sugar pine timber lands, the money to be expended in the biennium ending June 30, 1943. A large part of this sum was expended on control work during 1942. A memorandum of agreement defining the conditions of cooperation and enumerating the responsibilities of both parties was concluded by the Bureau and the State of California. This agreement, which became effective January, 1942, supersedes the agreement of 1936.

The three lumber companies in California cooperating financially in the project are: (1) The Red River Lumber Company, (2) The Diamond Match Company, and (3) the Michigan-California Lumber Company. Each of these made a cash contribution of \$2,000 which was available for expenditure on July 1, 1942. A memorandum of agreement between the Bureau and each lumber company was concluded during the early months of the year. The agreements cover the responsibilities of both parties and the conditions of cooperation.

*Entitled, "For Forest Protection Against the White Pine Blister Rust," approved April 26, 1940, Public 486-76th Congress, Chapter 159, 3rd Session, 54th Statute 168, 169.

The funds contributed by the State of California and the cooperating lumber companies were deposited in the Treasury of the United States, as provided in the agreements, and were available for expenditure by the Bureau. These funds were matched with Federal funds allocated to the Bureau's Oakland office, and the combined funds financed the cooperative control project.

The Bureau and the Division of Forestry of the California State Department of Natural Resources entered a separate agreement covering the conditions under which blister rust men and equipment may be used to assist in the fighting of fires, the suppression of which is the responsibility of the State Division of Forestry.

The State of Oregon did not participate in the cooperative control project, since no funds were made available by the State or by other agencies in Oregon for control work on state and privately owned timberlands.

LOCATION AND ORGANIZATION OF WORK

The areas given control treatment on this project were selected in joint consultations by the regional blister rust leaders and representatives of the state and private cooperators. The areas selected were on the Lassen, Plumas, and Eldorado National Forests and the Calaveras Big Trees State Park.

The Bureau employed the labor and supervisory personnel, constructed, equipped and maintained the six camps operated on the project. The labor, secured almost entirely from the colleges of California, was hired through the Oakland Office of Blister Rust Control. These young men developed rapidly into one of the most satisfactory labor crews the Bureau has employed in recent years. The camps varied in size from 15 to 45 men each and during most of the season quartered 135 men employed on the project. The labor turnover was not high, but replacements after July 15 were hard to find and, in general, were of poor quality.

Camps Engaged in Cooperative Ribes Eradication During 1942

National Forest	Location of Camp	Size of Camp	Operating Period
Lassen	Soda Springs	35 men	May 5 to September 19
Lassen	Viola	15 men	June 2 to September 12
Plumas	Cascade	45 men	June 10 to September 16
Eldorado	Davis Cabin	35 men	June 2 to September 19
Eldorado	Uncle Toms	35 men	June 15 to September 1
Calaveras State Park	Calaveras Big trees	20 men	June 25 to September 10
Total	6 camps	135 men	

During the season the blister rust crews helped suppress several forest fires and proved to be an important supplement to the regular fire fighting agencies.

Lassen National Forest

Ribes eradication work in the Lassen National Forest was done from two camps: the Soda Springs Camp, located about 35 miles east of Chico on the Deer Creek Highway, and the Viola Camp at Viola, California.

The area worked from the Soda Springs Camp is a part of the Diamond Match Company's holdings in the vicinity of Butte Meadows, and has been the scene of recent logging operations. Sugar pine reproduction predominates in the fast-growing stand of young trees that is now present. Brush cover is light to medium in density and the area is easily traversed. Ribes were first removed in 1933 and 1939 and regeneration of the plants since that time has been slow. Observations made this year indicate that substantial progress has been made toward permanent Ribes suppression on the unit.

The 35 men employed on this Ribes reeradication job removed 251,836 Ribes from 5,403 acres of land.

A small crew of 15 men stationed at the Viola Camp covered 25,000 acres of sugar pine timberlands by "spot working." "Spot working" is a departure from standard Ribes eradication practices and has been adopted as a delaying measure to retard the development and spread of the rust. Studies made of blister rust infections in the Sugar Pine Region have shown that the disease is exacting in its requirements of conditions necessary for reception and development. The most favorable conditions are found at such sites as streams, mountain meadows, road right-of-ways, and areas where openings in the forest cover may exist. The occurrence of all the necessary requirements for rust inception and development is most frequently found on the areas along streams or at meadows. Therefore, by removing the Ribes from these highly susceptible "spots", which may represent less than five per cent of a control unit, a high degree of protection is given to the entire area. "Spot working" results in short-term protection only and must be followed with a complete Ribes eradication job on the areas if serious damage is to be prevented. The shortage of labor and funds for control work has necessitated the adoption of "spot working" in order to minimize the losses from rust until the complete control job can be accomplished.

"Spot working" in the Viola area resulted in the eradication of 232,894 Ribes from 973 acres of stream type and meadows supporting heavy Ribes populations. By this work a high degree of protection has been afforded the 25,000 acres in which the favorable Ribes sites were found. Ribes in the upland areas are small and scattered. This work included the eradication of Ribes from a blister rust infection center discovered in 1933 on Bailey Creek. All blister rust cankers that were found during a diligent examination of the sugar pines at this infection center were removed, thus reducing the production of spores and decreasing the spread-hazard to other localities.

The Viola unit lies west of the Lassen Volcanic National Park and extends northward from the settlement of Mineral to the Latour Butte. The timber is mature and the stand contains a high percentage of excellent quality sugar pine. The Diamond Match Company and The Red River Lumber Company are the principal owners of the area. Federal ownership amounts to only eight per cent. Good roads afford easy access to most of the area.

Flumas National Forest

A 45-man blister rust camp at Cascade performed "spot working" Ribes eradication on the northern portion of the Cascade La Porte unit. The unit lies between the Middle Fork and the South Fork of the Feather River. The timber, which is nearly all mature, is of excellent quality, and is principally sugar pine and fir. This area has the highest precipitation of any of the control units in the Sierra and due to this abundance of moisture the timber is

growing at lower elevations than is common. Long, round-topped ridges separate the steep-sided canyons which drain the area southwestward. Ribes, while numerous throughout the unit, were most abundant along the streams.

"Spot working" resulted in the eradication of 631,825 Ribes from 2,557 acres. The areas worked were along streams, roadsides, and trails, and in old burns, and around mines. About 400 acres that were logged by the Feather River Pine Mills in 1939 were included in the worked area. Ribes were eradicated from several blister rust infection centers and all the cankers found on sugar pines were removed. Partial protection has been given to 42,000 acres by the "spot working" in this unit, but the degree of protection probably is not so high as that achieved in the Viola unit. The abundance of Ribes in the upland types of this unit is in contrast with the comparatively Ribes-free condition of the upland types of the Viola area. The removal of the Ribes and the blister rust cankers from the infection centers will prevent further rust intensification at these points and also delay the spread of the rust to new locations.

The tractor-powered Ribes rake was used to eradicate Ribes growing in especially dense concentrations in the basins at the heads of several draws. About 100 acres of these areas were successfully treated.

The absence of roads in this area made long walks necessary. Several trails were constructed to facilitate reaching the more isolated parts of the unit.

Eldorado National Forest

In the area east of Pino Grande on the Georgetown Divide, two 35-man camps worked from June until late September. The Davis Cabin Camp reworked areas initially treated in 1938 and the camp near Uncle Tom's Cabin worked entirely on initial Ribes eradication. The Michigan-California Lumber Company is the principal land owner in this district. The area has been logged recently and now is supporting an excellent stand of young sugar pine.

Standard eradication practices were followed by both camps in covering their assigned areas. The eradication efforts resulted in the initial treatment of 4,325 acres and the reworking of 3,186 acres. The two crews destroyed a total of 532,707 Ribes.

The Michigan-California Lumber Company aided the season's program materially by constructing more than three miles of new truck road into the control area.

Calaveras Big Trees State Park

A crew of 20 men was established in the old CCC camp at Calaveras Big Trees State Park in the latter part of June. Until early in September this crew did Ribes reeradication work in the State Park and on the areas immediately adjacent. One block of approximately 100 acres within the Park has been left unworked because the brush is so dense that work by hand eradication methods is not feasible. Some mechanical method of brush removal should be employed when this block is given its initial Ribes eradication.

Ribes regeneration in the worked area has been slow, the bushes found being scattered and small. The ground cover throughout most of the area is heavier than average, making the Ribes difficult to find.

The work on 1,325 acres resulted in the removal of 47,626 Ribes.

Checking

Seven checkers were employed by the Bureau to conduct the checking work on the cooperative project. Two were assigned to the Plumas-Lassen operation and five to the Stanislaus-Eldorado. These men performed all the necessary advance, post, and regular checking work for the project. Two checker man months were spent on "checker-flanker" work in conjunction with the methods development office.

A summary of all advance, post, and regular checking on this project can be found in Table 3.

Statistical Summaries

The cooperative project destroyed 1,769,413 Ribes on 7,308 acres of initial work and 12,086 acres of reeradication with the expenditure of 3,854 man days of labor.

Tables 1 through 7, which follow, present the results of the project statistically, the status of cooperative funds, and a summary of all control work on state and private lands.

Tables 4 and 5 include work done by all agencies engaged in Ribes eradication on state and private lands, whereas Tables 1 and 3 include only that work done by the Bureau of Entomology and Plant Quarantine and the Bureau of Plant Industry. The several tables are listed below:

Table 1. Summary of Cooperative Ribes Eradication in California in 1942.

Table 2. Summary of Cooperative Ribes Eradication in 1941-1942.

Table 3. Summary of Regular, Advance, and Post Checking on the Cooperative Project in 1942.

Table 4. Summary of Ribes Eradication by the Bureau of Entomology and Plant Quarantine in 1925-1942.

Table 5. Summary of Ribes Eradication on State and Private Lands in 1942.

Table 6. Summary of Ribes Eradication on State and Private Lands in 1925-1942.

Table 7. Status of Cooperative Funds for Ribes Eradication in California as of December 31, 1942.

TABLE #1

SUMMARY OF COOPERATIVE RIBES ERADICATION IN CALIFORNIA* IN 1942

Control Operation	Acres		8-Hour Man Days	Total Ribes Eradicated	Per Acre Worked 8-Hour Man Days	Acres Covered			Ownership Status 8-Hour Man Days			Ribes Eradicated		Acres free at time of Re- eradication	
	Worked	Blocked Out				Total	Federal	State	Private	Federal	State	Private	Federal		State
Initial Work															
Lassen National Forest	973	-	973	232,894	0.93	38		935	17		887	9,851		223,043	
Plumas National Forest	2,010	-	2,010	613,521	0.99	990		1,020	1,177		809	299,763		313,758	
El Dorado National Forest	3,895	430	4,325	444,989	0.52	460		3,865	283		2,140	39,950		405,039	
Total - - -	6,878	430	7,308	1,291,404	0.77	1,488		5,820	1,477		3,836	349,564		941,840	
Reeradication															
Lassen National Forest	5,403		5,403	251,836	0.33	47	400	5,003	132		1,652	18,636		233,200	1,106
Plumas National Forest	547		547	18,304	0.16	33	-	547	-		85	-		18,304	-
El Dorado National Forest	3,186		3,186	137,718	0.27	43	425	2,761	186		666	31,953		105,765	922
Stanislaus National Forest	1,825		1,825	47,626	0.19	26	80	1,745	6		348	2,101		45,525	170
Calaveras Big Trees State Park	1,125		1,125	22,525	0.41	20		1,050	75		446	20		722	390
Total - - -	12,086		12,086	478,009	0.29	40	905	1,050	324		2,771	52,690		403,516	2,588
All Workings															
Lassen National Forest	6,376		6,376	484,730	0.42	76	438	5,938	149		2,539	28,487		456,243	1,106
Plumas National Forest	2,557		2,557	631,825	0.81	247	990	1,567	1,177		894	299,763		332,062	-
El Dorado National Forest	7,081	430	7,511	582,707	0.46	82	885	6,626	469		2,806	71,903		510,804	922
Stanislaus National Forest	1,825		1,825	47,626	0.19	26	80	1,745	6		348	2,101		45,525	170
Calaveras Big Trees State Park	1,125		1,125	22,525	0.41	20		1,050	75		446	20		722	390
Total - - -	18,964	430	19,394	1,769,413	0.47	93	2,393	1,050	1,801		6,607	402,254		1,345,356	2,588

*No cooperative work done in Oregon



TABLE #2
SUMMARY OF COOPERATIVE RIBES ERADICATION 1941-1942

Class of Work	Acres		8-Hour Man Days	Total Ribes Eradicated	Per Acre Worked		Ownership Status						Ribes Eradicated		Acres Ribes-free at time of Re-eradication
	Worked	Blocked Out			8-Hour Man Days	Ribes	Acres Covered		8-Hour Man Days		Ribes Eradicated				
							Federal	Private	Federal	State	Federal	Private	Federal	Private	
Initial	6,878	430	7,308	1,291,404	0.77	188	1,488	5,820	-	1,477	3,836	-	349,564	941,840	-
Reeradication	19,314	-	19,314	650,199	0.27	34	2,487	15,777	1,050	619	4,191	446	80,875	547,521	21,803
Total - -	26,192	430	26,622	1,941,603	0.40	74	3,975	21,597	1,050	2,096	8,027	446	430,439	1,489,361	21,803
															3,458



TABLE #3

SUMMARY OF REGULAR, ADVANCE, AND POST CHECKING ON THE COOPERATIVE PROJECT -- 1942

Operation	Regular Check			Advance Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days
California												
Plumas-	5,404	5.0	104 7/8	-	-	-	7,808	3.8	132 1/8	13,212	4.3	237
Lassen												
Stanislaus-	8,613	4.4	204	5,340	3.0	75 2/8	5,851	3.8	80 1/8	19,804	3.9	359 3/8
Eldorado												
Total	14,017	4.6	308 7/8	5,340	3.0	75 2/8	13,659	3.8	212 2/8	33,016	4.0	596 3/8

N.B. - No cooperative work performed in Oregon during 1942.



SUMMARY OF RIBES ERADICATION BY THE BUREAU OF ENTOMOLOGY & PLANT QUARANTINE 1925-1942

[illegible]

total	=	579.6	188.20	174.4	366.422	88.9	3.82	0.62	153	253,338	24,533	128,269	462,951	6,774	161,380	5,074	166,454	196,111
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Includes 7,516 acres, 3,905 man days, and 1,217.953 Bales on lands worked by the Bureau of Entomology & Plant Quarantine now in Yosemite National Park.

•Includes 480 acres, 326 man days, 298,657 Hives on lands worked by the Bureau of Entomology & Plant Quarantine now in Yosemite National Park.



TABLE #5
(Omnibus Table #3)

SUMMARY OF RIBES ERADICATION ON STATE AND PRIVATE LANDS - 1942

State	Initial Work			Reeradication Work			Total		
	Acreage Worked	Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Ribes Destroyed	Number 8-Hour Man Days
California	10,914	1,638,936	8,842	14,156	984,845	5,306	25,070	2,603,781	14,148
Oregon	40	2,877	111	-	-	-	40	2,877	111
Total --	10,954	1,641,813	8,953	14,156	984,845	5,306	25,110	2,606,658	14,259

TABLE #6
(Omnibus Table #4A)

SUMMARY OF RIBES ERADICATION ON STATE AND PRIVATE LANDS 1925-1942 (INCLUSIVE)

State	Net Control Area		Initial Eradication Work			Reeradication Work			Total		
	Acreage of White Pine in Net Control Area	Total Acreage (W.P. & Prot. Zones)	Gross Acreage Reported Initially Worked	Net Acreage Worked in Control Area	Gross Number 8-Hour Man Days	Gross Acreage Reported Worked	Net Acreage Reported in Control Area	Gross Number 8-Hour Man Days	Gross Initial Net Acreage and Reworked	Gross Number Wild & Cultivated Ribes Destroyed	Gross Number 8-Hour Man Days
California	876,735	876,735	320,734	312,898	191,870	114,814	114,374	8,282,756	462,548	55,714,636	271,197
Oregon	168,175	168,175	104,497	104,497	14,736	12,192	12,192	172,531	116,589	1,905,562	16,589
Total --	1,044,910	1,044,910	425,231	417,395	206,606	126,006	126,566	8,455,287	579,137	57,620,248	287,786

TABLE 7

STATUS OF COOPERATIVE FUNDS FOR RIBES ERADICATION
IN CALIFORNIA AS OF DECEMBER 31, 1942

Source	Appropriation		Amount Expended in Calendar Year 1941	Amount Expended in Calendar Year 1942		Available Unexpended Balances
	Fiscal Year	Amount		January 1 to June 30, 1942 (F.Y. 1942)	July 1 to Dec. 31, 1942 (F.Y. 1943)	
					Totals	
STATE AND PRIVATE FUNDS						
State of California	Biennium July 1, 1941 to June 30, 1943	\$ 50,000	-	\$ 14,196	\$ 21,440	\$ 14,364
Private Cooperators*	Deposited after July 1, 1942	6,000	-	-	5,900	100
Subtotals	- - - - -	56,000	-	14,196	27,340	14,464
FEDERAL FUNDS						
Federal Lea Act	1942	14,625	\$ 14,612	-	-	-
	1943	64,695	-	-	38,150	26,545
Other	1941	5,300	5,300	-	-	-
Federal	1942	6,250	-	6,250	-	-
Subtotals	- - - - -	90,870	19,912	6,250	38,150	26,545
Totals	- - - - -	\$ 146,870	\$ 19,912	\$ 20,446	\$ 65,490	\$ 41,009

*Michigan-California Lumber Company, Red River Lumber Company, and Diamond Match Company each contributed \$2,000.

PART IV

BLISTER RUST CONTROL BY THE FOREST SERVICE

Financial Project BLR-4

By

Benton Howard, Associate Forester

OBJECTIVES

The Forest Service is responsible for land management and the protection and maintenance of timber on national forest lands. This responsibility includes the protection from white pine blister rust of Federally-owned white and sugar pine stands administered by them. The Forest Service has accepted as its responsibility the protection from blister rust of white and sugar pine timber on all large areas predominantly in national forest ownership. The several Agriculture Appropriation Acts, under which funds have been made available, and the Lea Act of 1940 authorize Federal agencies to conduct blister rust control work on such intermingled private lands as may endanger public holdings.

The entire 1942 Forest Service program was pointed toward two objectives: first, the reeradication of Ribes from cut-over areas on which aggressive regeneration had occurred, and secondly, initial Ribes eradication on cut-over lands lying within the present range of blister rust infections.

COOPERATIVE UNDERSTANDINGS

The blister rust control program of the Forest Service was conducted under the same general plan as that followed in previous years. The Cooperative Agreement established in 1937 between Region 5 of the Forest Service and the Bureau of Entomology and Plant Quarantine was continued. This agreement essentially provides: that the Bureau shall furnish leadership, technical direction, and coordination of all blister rust activities on the national forests and that the Forest Service shall be responsible for the administration and operation of all blister rust control camps financed with its funds. During 1942, Region 6 of the United States Forest Service and the Bureau of Entomology and Plant Quarantine entered into a similar agreement for the conduct of blister rust work on the Rogue River National Forest of Oregon.

Under the terms of these general agreements the Bureau and each forest, actively engaged in a Ribes eradication program, established cooperative arrangements to meet specific needs.

The armed forces of the United States depleted the ranks of experienced blister rust technicians employed by the Forest Service and as a result the Bureau's technical supervisors assisted in the administration of the Forest Service camps on the Rogue River, Klamath, Stanislaus, and Sierra National Forests.

The blister rust control program on the Plumas National Forest was conducted under the terms of the general agreement with camps of both agencies present. The Forest Service was directly responsible for all phases of administration

and operation of its camps, whereas the Bureau furnished technical advice and assistance. Mr. E. H. Kincaid, Assistant Forester, was transferred from the Eldorado National Forest to administer the blister rust job. Subsistence supplies were purchased by the Forest Service for the Bureau's camps on the Lassen and Plumas Forests. Reimbursement for these supplies was made periodically. A joint system of transportation was established to supply the camps.

Camps of both the Forest Service and Bureau were maintained on the Stanislaus National Forest. The Forest Service purchased subsistence supplies for both agencies and periodic reimbursement was made by the Bureau.

LOCATION, ORGANIZATION AND RESULTS OF THE WORK

Ribes Eradication

The Forest Service operated ten blister rust control camps on five national forests. These camps employed 380 men at the peak of the season. A few experienced men returned and some local labor was recruited. Most of the labor, however, was secured from the universities, colleges, and high schools of the west. These students were young, new to the woods, and in most instances unaccustomed to manual labor. They were enthusiastic and showed continued improvement throughout the season. The crewmen were given systematic training not only in blister rust work but also in camp life and woodsmanship. Many of the camp bosses employed were new to Ribes eradication and required training in its technique. As a result of so many inexperienced men it took close supervision to keep the camps functioning properly.

All crews were given training in the methods and principles of fire fighting by the regular fire training personnel of the Forest Service. During August and September the camps were valuable additions to the fire suppression forces.

Rogue River National Forest

The Rogue River National Forest in Oregon operated a 20-man blister rust crew at Union Creek. All men were assigned to the reeradication of Ribes from national forest lands of the Upper Rogue River unit. The initial Ribes eradication on this unit was done from 1935 to 1938. Several small areas, on which the Ribes had reestablished themselves to a greater extent than on the remainder of the unit, were selected for treatment.

Klamath National Forest

The Beaver Creek and Hungry Creek camps, of 40 men each, were established on the Beaver Creek unit. The camps were in operation from the middle of May to early in October when they were closed owing to inclement weather. They continued with initial Ribes eradication on cut-over lands just south of the Oregon line and adjacent to the area worked during 1941.

During the summer of 1941 Ribes on some areas were heavily infected with blister rust and these areas were worked rapidly to forestall the spread of the rust to the sugar pines. As a result of this rapid coverage many small Ribes were overlooked and consequently much Ribes live stem remained. This year additional work was done on 1,530 acres of these lands in order to leave them in a satisfactory condition.

Blister rust is now present along the streams and in the more favorable spots throughout the Beaver Creek unit. Numerous Ribes sanguineum growing in association with young sugar pines made this area particularly subject to rapid

intensification of the rust and probable heavy resultant damage to the pines. Blister rust cankers were removed from the sugar pines over most of the unit, and where the Ribes have also been removed little damage is anticipated in the future. Ribes averaged 106 per acre with some localized spots having well over 1,000 bushes per acre. The sugar pine reproduction on these lands is associated with Douglas fir and ponderosa pine. These cut-over lands are steep and brushy and are traversed by many streams.

Plumas National Forest

Ribes eradication was continued on cut-over lands of the Granite Basin unit by two camps which were in operation from June until September. A 70-man camp was located in the center of Granite Basin and the other, a 40-man camp, was near Merrimac. The area is generally brushy with some dense brush fields present. The topography is moderate to steep. The Ribes averaged 181 per acre. Sugar pine reproduction varied from fair over most of the area to excellent in some parts.

A 20-man camp, which was established near Quincy early in September, reeradicated Ribes from recently cut-over lands of the Thompson Creek unit. The camp was terminated upon the completion of this work early in October. This unit had been treated initially in 1935 and 1936. Some of the unit was logged during 1939-40 and following logging in 1939 a severe burn occurred on part of the area. The entire area was given a second working in 1940. However, as a result of the disturbance in 1939 and 1940 Ribes had become reestablished on the cut-over lands, being a thousand per acre in some places. The bushes were large, vigorous and about to produce abundant fruit, and the need for reeradication was acute. All work was limited to these disturbed areas which were supporting many Ribes. The mature timbered parts of the unit have so few Ribes present, as a result of the two workings, as to require no Ribes eradication in the near future.

Stanislaus National Forest

The Ribes eradication program on the Stanislaus consisted of a 33-man camp at Bumblebee and a 20-man camp at Woods Ridge. The Ribes reeradication job on the Cow Creek unit, started in 1941, was finished this season by crews from the Bumblebee camp. This area is brushy and the topography is moderate. The Ribes, though numerous, were generally small in size. Ribes regeneration has been particularly persistent on the Cow Creek unit.

The Woods Ridge Camp did reeradication work on areas which were initially worked in 1936. The timber on these areas was logged during 1938 and 1940 and as a result of this disturbance many Ribes reappeared on the more favorable sites. These Ribes sites, such as railroad grades, landings and stream banks, were restricted in extent and were the only areas which received Ribes eradication. Initial Ribes eradication was done on lands cutover in 1937. On these lands Ribes were plentiful with many large vigorous bushes which were fruiting abundantly. The ground cover is open and the topography moderate.

Sierra National Forest

Two camps were established on the northern control units of the Sierra National Forest: one at Miami and the other at Summit Camp on Chowchilla Mountain. Eighty men from these two camps were engaged in Ribes reeradication from the first of June to the middle of September.

Both camps started work on the Pine City Mountain Plantation, which had been stripped of brush and planted subsequent to the initial Ribes eradication. Later in the season, after the snow pack had melted, Summit Camp shifted activities to Chowchilla Mountain, and the Miami crews to the Yosemite Mountain Ranch area. On Chowchilla Mountain some steep slopes are present, elsewhere the topography is moderate. All the areas worked are cutover and are generally brushy. Dense masses of lupine grow in many places and Ribes present in them were difficult to detect.

The work this season was performed on areas which are exceedingly favorable for Ribes establishment and development. Many seedlings appear each year, growth is vigorous, and the bushes produce abundant fruit at an early age. Successive reeradication should be spaced at three-year intervals in order to prevent the production of great quantities of seed.

Initial Ribes eradication was done on 294 acres near Miami in order to complete the control unit in that vicinity.

Summary of Ribes Eradication

The initial job of Ribes eradication on national forest lands is 32 per cent complete as of December 31, 1942. The camps on the Klamath National Forest performed only initial Ribes eradication. The Plumas National Forest blister rust camps were primarily engaged in the initial treatment of cut-over lands, but were able to do some Ribes reeradication. The other forests were able to do some initial work along with their Ribes reeradication program. During the past few years initial Ribes eradication generally has been confined to cut-over lands supporting many Ribes. As a result of this policy a relatively high percentage of these lands now have had an initial Ribes eradication. Young sugar pines on cut-over lands are more liable to infection and damage from blister rust than are young sugar pines in mature timber stands, since conditions are much more favorable for blister rust inception and intensification.

The reworking of areas on which prolific Ribes regeneration has taken place has been kept up currently. Ribes have been reeradicated from nearly all units as ecological conditions required and the reeradication program is on schedule. In recent years efforts have been largely restricted to cut-over and other lands on which Ribes regeneration has been sufficiently vigorous and aggressive to threaten the establishment of a new cycle of Ribes populations from new seed.

The detailed results of the season's work are summarized in the tables at the conclusion of this part of the report. Table 2 is an accumulative record of all work done by the Forest Service since the inception of its program in 1933. Maps of each forest, which are to be found at the end of Part II, depict in color the areas covered this season, work done prior to 1942, and the areas remaining to be worked.

Checking

The checking work for the Forest Service camps was directed by the Bureau's checking supervisors in accordance with the Memorandum of Agreement. The required advance and post checks were made before Ribes eradication while the regular checks were done following crew work.

A four-man checking party sampled 3,762 acres in the Cinnabar Springs control unit of the Klamath National Forest in preparation for the 1943 season. Some

advance and post checking was accomplished on the other forests on areas which are to be worked in 1943.

The Forest Service reimbursed the Bureau for all checking work done in their camps and for its proportionate share of the checking supervision. Checking accomplishments are summarized in Table 3.

EXPENDITURES

All funds expended by the Forest Service were from the Agricultural Appropriation Acts for the fiscal years 1942 and 1943. A total of \$227,055 was expended during the calendar year of 1942. Of this amount \$214,045 were spent in California and \$13,010 in Oregon.

RECOMMENDATIONS

All blister rust control work during the war period, when funds and labor are at a premium, should be done where the maximum protection can be purchased at the minimum cost. This can be best accomplished by limiting the blister rust control program to the following three classes of Ribes eradication work.

1. The reeradication of Ribes should be done on areas previously treated and on which the bushes have vigorously regenerated to the point where a new cycle of Ribes populations are apt to become established through new seed about to be produced.
2. Ribes should be eradicated from cut-over lands, supporting numerous Ribes, which are within the range of blister rust infections. The young sugar pines on these areas are threatened with damage from blister rust within the near future, since conditions are more favorable for blister rust inception and intensification on cut-over lands than on areas supporting mature timber.
3. Areas supporting medium Ribes concentrations within the range of blister rust infection should be spot worked. This entails the removal of Ribes from existing and probable infection centers. Any place where numerous Ribes and sugar pines are growing in close association near surface water and with an open crown canopy present is a probable infection center. These places usually are along streams and around springs, meadows, and clearings. This type of Ribes eradication is applicable to mature timbered areas where blister rust inception and intensification spots are rather limited in number and extent. This should be regarded as a delaying action, to improve our position, on the expectation of a greatly augmented program following the war, when the entire areas should be treated.

The priority and urgency of work on the various areas must be decided each year. The controlling factors which should be considered in allotting camps are: the funds and labor available, the developments in the spread and intensification of the rust, and the ecological conditions present on specific areas.

TABLE #1

SUMMARY OF RIBES ERADICATION BY THE FOREST SERVICE IN 1942*

National Forest	Acres			8-Hour Man Days	Total Ribes Eradicated	Per Acre Worked		Ownership Status						Acres Ribes-free at time of Re-eradication
	Worked	Blocked Out	Total			8-Hour Man Days	Ribes	Acres Covered		8-Hour Man Days		Ribes Eradicated		
								Federal	Private	Federal	Private	Federal	Private	
Initial Work														
California:														
Klamath	5,172	655	5,827	5,332	558,441	1.03	108	2,482	3,345	1,902	3,430	305,254	253,187	
Plumas	5,694	925	6,619	5,279	1,032,712	0.93	181	5,595	1,024	4,595	684	914,641	118,071	
Stanislaus	725		725	892	325,838	1.23	449	-	725	-	892	-	325,838	
Sierra	294		294	486	75,081	1.65	255	294	-	486	-	75,081	-	
Total - - - -	11,885	1,580	13,465	11,989	1,992,072	1.01	168	8,371	5,094	6,983	5,006	1,294,976	697,096	
Reeradication														
California:														
Plumas	925		925	310	142,931	0.34	155	10	915	4	306	999	141,932	627
Stanislaus	6,675		6,675	2,191	330,333	0.33	49	5,935	740	1,929	262	255,554	74,779	1,531
Sierra	3,719		3,719	3,934	953,895	1.06	256	2,399	1,320	2,413	1,521	631,080	322,815	-
Subtotal - -	11,319		11,319	6,435	1,427,159	0.57	126	8,344	2,975	4,346	2,089	887,633	539,526	2,158
Oregon:														
Rogue River**	1,510		1,510	962	149,346	0.64	99	1,510	-	962	-	149,346	-	-
Total - - - -	12,829		12,829	7,397	1,576,505	0.58	123	9,854	2,975	5,308	2,089	1,036,979	539,526	2,158
All Workings														
California:														
Klamath	5,172	655	5,827	5,332	558,441	1.03	108	2,482	3,345	1,902	3,430	305,254	253,187	
Plumas	6,619	925	7,544	5,589	1,175,643	0.84	178	5,605	1,939	4,599	990	915,640	260,003	627
Stanislaus	7,400		7,400	3,083	656,171	0.42	89	5,935	1,465	1,929	1,154	255,554	400,617	1,531
Sierra	4,013		4,013	4,420	1,028,976	1.10	256	2,693	1,320	2,899	1,521	706,161	322,815	-
Subtotal - -	23,204	1,580	24,784	18,424	3,419,231	0.79	147	16,715	8,069	11,329	7,095	2,182,609	1,236,622	2,158
Oregon:														
Rogue River	1,510		1,510	962	149,346	0.64	99	1,510	-	962	-	149,346	-	-
Total - - - -	24,714	1,580	26,294	19,386	3,568,577	0.78	144	18,225	8,069	12,291	7,095	2,331,955	1,236,622	2,158

* All work financed with regular funds.

** Initial work performed by B.E. P. Q.

TABLE #2

SUMMARY OF RIBES ERADICATION BY THE FOREST SERVICE 1933-1942

National Forest	Acree			8-Hour Man Days	Total Ribes Eradicated	Per Acre Worked		Ownership Status						Acree Ribes-free at time of Re- eradication
	Worked	Blocked Out	Total			8-Hour Man Days	Ribes	Acree Covered		8-Hour Man Days		Ribes Eradicated		
								Federal	Private	Federal	Private	Federal	Private	
Initial Work														
California:														
Klamath	9,292	893	10,185	8,213	767,177	0.88	83	3,199	6,986	2,265	5,948	335,085	432,092	
Lassen	17,688	1,399	19,087	16,936	1,941,142	0.96	110	2,716	16,371	2,268	14,668	302,147	1,658,995	
Plumas	56,103	9,153	65,256	56,445	8,828,138	1.01	157	56,179	9,077	40,570	15,875	6,970,311	1,857,827	
Eldorado	38,503	5,119	43,622	26,021	6,968,575	0.68	121	40,058	3,564	19,123	6,898	5,827,361	1,141,214	
Stanislaus*	47,221	9,121	56,342	27,134	6,917,702	0.57	146	51,454	4,888	22,669	4,465	5,693,959	1,223,743	
Sierra	11,960	483	12,443	36,461	7,846,008	3.05	658	11,067	1,376	34,110	2,351	7,202,352	643,656	
Subtotal - -	180,767	26,168	206,935	171,210	33,268,742	0.95	184	164,673	42,262	121,005	50,205	26,331,215	6,937,527	
Oregon:														
White Pine Plant.	145	535	680	373	124,744	2.57	860	680		373		124,744		
Total - - - -	180,912	26,703	207,615	171,583	33,393,486	0.95	185	165,353	42,262	121,378	50,205	26,455,959	6,937,527	
Reeradication														
California:														
Lassen	4,779		4,779	2,346	204,095	0.49	43	622	4,157	261	2,085	5,014	199,081	6,121
Plumas	48,912		48,912	31,090	3,066,406	0.64	63	29,433	19,479	18,472	12,618	1,520,698	1,545,708	23,305
Eldorado	44,707		44,707	28,083	1,901,746	0.63	43	27,210	17,497	17,577	10,506	1,049,729	852,017	4,926
Stanislaus	61,910		61,910	32,525	3,453,239	0.53	56	43,690	18,220	18,566	13,959	2,880,082	573,157	17,113
Sierra	35,787		35,787	22,726	8,599,315	0.63	240	29,302	6,485	18,959	3,767	7,788,165	811,150	760
Subtotal - -	196,095		196,095	116,770	17,224,801	0.60	88	130,257	65,838	73,835	42,935	13,243,688	3,981,113	52,225
Oregon:														
Rogue River	1,510		1,510	962	149,346	0.64	99	1,510		962		149,346		-
White Pine Plant.	212		212	228	29,957	1.08	141	212		228		29,957		395
Subtotal - -	1,722		1,722	1,190	179,303	0.69	104	1,722		1,190		179,303		395
Total - - - -	197,817		197,817	117,960	17,404,104	0.60	88	131,979	65,838	75,025	42,935	13,422,991	3,981,113	52,620
All Workings														
California:														
Klamath	9,292	893	10,185	8,213	767,177	0.88	83	3,199	6,986	2,265	5,948	335,085	432,092	-
Lassen	22,467	1,399	23,866	19,282	2,145,237	0.86	95	3,338	20,528	2,529	16,753	307,161	1,838,076	6,121
Plumas	105,015	9,153	114,168	87,535	11,894,544	0.83	113	85,612	28,556	59,042	28,493	8,491,009	3,403,535	23,305
Eldorado	83,210	5,119	88,329	54,104	8,870,321	0.65	107	67,268	21,061	36,700	17,404	6,877,090	1,993,231	4,926
Stanislaus	109,131	9,121	118,252	59,659	10,370,941	0.55	95	95,144	23,108	41,235	18,424	8,574,041	1,796,900	17,113
Sierra	47,747	483	48,230	59,187	16,445,323	1.24	344	40,369	7,861	53,069	6,118	14,990,517	1,454,806	760
Subtotal - -	376,862	26,168	403,030	287,980	50,493,543	0.76	134	294,930	108,100	194,840	93,140	39,578,903	10,918,640	52,225
Oregon:														
Rogue River	1,510		1,510	962	149,346	0.64	99	1,510		962		149,346		-
White Pine Plant.	357	535	892	601	154,701	1.68	433	892		601		154,701		395
Subtotal - -	1,867	535	2,402	1,563	304,047	0.84	163	2,402		1,563		304,047		395
Total - - - -	378,729	26,703	405,432	289,543	50,797,590	0.76	134	297,332	108,100	196,403	93,140	39,878,950	10,918,640	52,620

*Includes 690 acres, 1,672 man days, and 493,900 Ribes worked by U.S. Forest Service now in Yosemite National Park.

TABLE #3

SUMMARY OF REGULAR, ADVANCE, AND POST CHECKING ON THE FOREST SERVICE PROJECT - 1942

Operation	Regular Check			Advance Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days
Oregon												
Rogue River	1,330	4.8	27 4/8	-	-	-	5,331	4.6	81 7/8	6,661	4.6	109 3/8
California												
Klamath	5,892	4.7	171 6/8	12,850	3.4	156 1/8	-	-	-	18,742	3.8	327 7/8
Plumas-Iassen	5,169	5.1	128 4/8	3,295	3.7	55 6/8	2,628	4.7	48	11,092	4.6	232 2/8
Stanislaus-Eldorado	5,870	4.7	147	690	1.5	2 6/8	3,312	3.9	49 7/8	9,872	4.2	199 5/8
Sierra	3,549	5.0	76 2/8	300	2.1	3 7/8	5,240	3.9	98 2/8	9,089	4.3	178 3/8
Total	20,480	4.9	523 4/8	17,135	3.4	218 4/8	11,180	4.1	196 1/8	48,795	4.2	938 1/8
Total												
Sugar Pine Region	21,810	4.9	551	17,135	3.4	218 4/8	16,511	4.2	278	55,456	4.2	1,047 4/8

TABLE #4
(Omnibus Table #31)
SUMMARY OF RIBES ERADICATION ON NATIONAL FOREST LAND - 1942

National Forest	Initial Work			Reeradication Work			Totals	
	Acreage Worked	Ribes Destroyed	Number 6-hour Men Days	Acreage Worked	Ribes Destroyed	Number 6-hour Men Days	Acreage Worked	Ribes Destroyed
Klamath	2,482	305,254	1,902	-	-	-	2,482	305,254
Lassen	78	9,651	17	400	18,636	132	438	28,487
Plumas	6,565	1,214,404	5,772	10	999	4	6,595	1,215,403
Kidorado	480	39,950	283	425	31,953	185	885	71,903
Sierralema	-	-	-	6,015	257,695	1,935	6,015	257,695
Sierra	294	75,081	485	2,399	531,080	2,413	2,693	706,161
California	9,859	1,644,540	8,460	9,249	940,323	4,670	19,108	2,584,863
Subtotal - Rogue River	1,565	-	828	1,510	149,346	962	1,510	149,346
Sierrayou	4,565	37,802	828	-	-	-	4,565	37,802
Oregon	4,565	37,802	828	1,510	149,346	962	6,175	187,148
Subtotal -	14,524	1,682,342	9,288	10,759	1,089,659	5,532	25,283	2,772,011
Grand Total-								14,920

TABLE #5
(Omnibus Table #44)
SUMMARY OF RIBES ERADICATION ON NATIONAL FOREST LAND 1925-1942 (INCLUSIVE)

National Forest	Acreage of White Pine in Net Control Area	Net Control Area		Initial Eradication Work			Reeradication Work			Totals		
		Total Acreage (W.P. & Prot. Zones)	Acreage Not Initially Worked	Net Acreage Worked in Control Area	Gross Number Wild & Cultivated Ribes Destroyed	Gross Number 8-Hour Men Days	Gross Acreage Reported	Net Acreage Eradicated in Control Area	Gross Number Wild & Cultivated Ribes Destroyed	Gross Number 8-Hour Men Days	Net Acreage Initial and Reworked	Gross Number Wild & Cultivated Ribes Destroyed
Klamath				1,199	335,085	2,265	-	1,739	-	-	1,199	335,085
Lassen				7,414	575,188	1,510	-	1,739	-	507	9,153	631,265
Plumas				78,782	10,110,335	5,772	35,692	15,692	1,697,016	21,566	114,384	11,988,249
Kidorado				65,463	9,511,905	3,029	34,326	14,326	1,627,462	27,287	102,711	10,935,357
Sierralema				75,869	7,982,678	32,135	70,272	70,272	5,779,245	29,249	147,111	13,761,972
Sierra				46,705	18,133,056	88,169	30,187	30,187	7,952,162	19,962	76,892	20,085,218
California				279,432	46,638,247	211,009	172,328	172,288	17,080,871	92,571	451,750	63,719,118
Subtotal - Mt. Hood				2,509	-	-	1,726	-	-	-	4,235	105,580
Klamath				3,739	419,719	4,607	-	-	-	-	3,739	419,719
Rogue River				65,155	14,436,200	38,574	22,460	22,460	916,277	6,826	87,615	15,412,477
Sierrayou				13,508	251,132	3,519	-	-	261,132	-	13,508	261,132
Sierralema				680	124,744	173	212	212	29,957	228	892	154,701
Oregon				85,691	15,291,795	47,073	24,398	22,672	946,234	6,854	110,089	16,238,029
Subtotal -				225,127	142,045	-	-	-	-	-	225,127	142,045
Grand Total-	1,109,399	1,109,399	747,255	362,144	61,920,042	260,082	196,726	194,960	18,027,105	99,425	561,849	79,957,147

TABLE #6

SUMMARY OF RIBES ERADICATION BY AGENCY ON NATIONAL FOREST LAND 1925-1942

Sugar Pine Region	Acreage of National Forest Land In Control Area	Calendar Year	Acreage Worked By						Total Acreage Worked			Total Acreage According to Present Owner- ship (Initial Erad.)	Unworked Acreage	
			Forest Service			Bureau			By All Agencies					
			Initial Work	Reeradi- cation	Total	Initial Work	Reeradi- cation	Total	Initial Work	Reeradi- cation	Total			
														O & C
CALIFORNIA	884,272	1926-41	156,302	121,913	278,215	113,271	-	41,166	154,437	269,573	163,079	432,652	279,062	605,210
		1942	8,371	8,344	16,715	1,488	-	905	2,393	9,859	9,249	19,108		
		Total	- - -	164,673	130,257	294,930	114,759	-	42,071	156,830	279,432	172,328		
OREGON	225,127	1925-41	680	212	892	78,165	2,181	22,676	100,841	81,026	22,888	103,914	83,082 *	142,045
		1942	-	1,510	1,510	-	4,665	-	4,665	4,665	1,510	6,175		
		Total	- - -	680	1,722	2,402	78,165	6,846	22,676	100,841	85,691	24,398		
Grand Total	1,109,399	-	165,353	131,979	297,332	192,924	6,846	64,747	257,671	365,123	196,726	561,849	362,144	747,255

*Excludes 2,609 acres of initial work in abandoned Mt. Hood Unit.

PART V

BLISTER RUST CONTROL BY THE NATIONAL PARK SERVICE FINANCIAL PROJECT BLR-5

By

Frank A. Patty, Associate Pathologist

OBJECTIVE

The ultimate objective is the control of white pine blister rust on national park lands supporting white pine that has recreational, aesthetic, and park value. To accomplish this objective Ribes must be suppressed wherever five-needled pines are to be perpetuated. Blister rust not only kills the trees, the killing of which may extend over many years in the forest, but badly disfigures them with cankers and dead branches and reduces the value of the area for park purposes.

COOPERATIVE AGREEMENTS

Through the Regional Office of the National Park Service a cooperative agreement was drawn up between the Bureau and Yosemite National Park in 1941 and extended to include the following year with only a few minor changes. A similar understanding was reached with Sequoia National Park in 1939 and 1942. Under the agreement the Bureau's operation and checking supervisors work with representatives of the National Park superintendents. The Bureau agrees to furnish technical supervision, to assist in preparing work plans, to make disease surveys, to determine the rate of spread of the rust, to define control standards for efficient work in terms of quantity and quality, to conduct preeradication surveys and checking, and to maintain regional records and maps. In addition all checkers are selected, employed, and paid by the Bureau, and reimbursements for their services, as well as the Parks' proportionate share of the cost of their supervision, are made by the National Park Service. The Bureau also assists the National Park Service in the procurement of labor.

LOCATION AND ORGANIZATION OF WORK

For the National Park Service the 1942 season marked the end of the first and the beginning of the second fiscal year of blister rust control work on regular funds. Prior to July 1, 1941, all Ribes eradication work had been dependent upon CCC labor, but the program was greatly curtailed in 1941 and completely eliminated the following year. If regular funds had not been made available at that time, the liquidation of the CCC organization would have given the blister rust control program a serious setback.

Yosemite National Park

The Regional Office of the National Park Service allotted sufficient regular funds to Yosemite National Park to employ 100 men for five months. The Ribes eradication work began April 23 and continued to October 29, although the bulk of the work was suspended at the end of September - only 10 to 20 men remaining on the pay rolls during October.

Thirty local men reported for duty on April 23 and were supplemented later by students from high schools and junior colleges. Ample student labor was available until July 15, but from that time on only a few replacements were to be had. During the season many blister rust men either enlisted or were inducted into the armed forces, and a few sought higher wages in war industries in spite of the fact that wages had been increased to 60 and 70 cents per hour for crewmen and crewleaders, respectively. It usually required three weeks to condition and train the student labor, but once the men hit their stride, they turned out to be excellent eradicators.

Blister rust control crews worked 48 hours a week to conform to the periods of other Park per diem employees. Each man was assessed one dollar a month under a compulsory medical and hospital plan, set up to take care of illness and non-compensable injuries.

The Valley camp with a quota of sixty six men operated out of Yosemite Valley and worked in the general area from the Wawona Tunnel to Chinquapin, mostly south of the Wawona Road. Much time was also spent on the north side of the Merced River along the New Oak Flat Road and in the Big Meadow area. (See map page 41). Ribes eradication extended below both roads to either the rim of the canyon, to the edge of the sugar pine type, or to the Park boundary. A very small area of logged-over land, heavily populated with Ribes, in the Bishop Creek drainage also received treatment. This work was all initial eradication. The thirty three-man camp at Crane Flat, operating from July 2 to September 2, conducted both initial and reeradication work in the logged-over lands west of the camp.

The Ribes eradication program in Yosemite National Park was under the direction of Park Forester Emil Ernst, assisted by a foreman in each camp. In Yosemite Valley the blister rust men were quartered with the men from the other Park projects, and the subsistence and camp maintenance were handled by another department. At Crane Flat the foreman was responsible for the camp maintenance but not the subsisting of the men.

All employees received two full days of intensive fire training which included actual fire trail construction, fire control methods, the use of fire tools and first aid. At the beginning of the fire season frequent requests for assistance were received by the National Park Service from outside fire protective agencies. At first blister rust workers were dispatched to help these agencies. The men often returned from fighting fires, suffering from poison oak, fatigue, infection, sprains, and other ailments that usually caused a greater loss of time than the fires. For these reasons after July 1, requests for assistance had to be denied all agencies except the ones adjacent to Yosemite National Park.

As many as four checkers were employed at one time, although the average for the season was three. The checkers were younger than they have been in the past and the turnover was considerable. Regular checking covered 8,855 acres and advance checking 6,419 acres; much of the advance checking was just ahead of the crew work. Lack of sufficient personnel prevented building up additional post check reserve.*

*Note: Advance checking comes before initial eradication; post checking before reeradication, and regular checking immediately following initial or reeradication.

Sequoia National Park

In Sequoia National Park the Marble Fork CCC Camp initiated the blister rust control program in 1939, and nothing more was done until 1942 when regular funds were allotted for two forty-man camps. One camp operated from June 10 to August 31, and the other from August 1 to September 30. Personnel for the first camp was recruited from the high schools and junior colleges in the San Joaquin Valley. The other obtained its labor from the CCC camps that were disbanding at that time. Few replacements of men were made after the camps had been established.

Assistant Superintendent D. J. Tobin gave the work general supervision and was assisted by a foreman in each camp. Both camps occupied the Red Fir site and used the same camp facilities. The mess was contracted so the foremen had only the field work and camp maintenance to look after. One camp was organized as a combination blister rust and fire protection unit. Emergency fire fighting money was allotted to care for any work pertaining to fire. The crews worked areas close to the roads, a man was stationed at a telephone all the time, and special fire fighting equipment was carried on the trucks. A foreman and an assistant foreman, well equipped to handle both blister rust and fires, had charge of this unit. In spite of the fact that critical fire weather prevailed throughout August and during the first half of September only two days' time were spent by this camp fighting fires.

A new system of "fire standby", tried for the first time in Sequoia National Park, proved to be very satisfactory both from the standpoint of the men and of the National Park Service. One camp took the usual Saturday afternoon and Sunday off and the other worked during the week end, taking a day and a half off the following week, usually Monday afternoon and Tuesday. This staggering of work days made it possible to have a full camp available for fire protection seven days a week without anyone having to remain in camp on his time off.

WORK PERFORMED AND RESULTS OBTAINED

Yosemite National Park

The blister rust camps in Yosemite National Park worked 6,350 acres initially and 346 acres for the second time. An additional 3,839 acres were found to be Ribes free and were blocked out. In covering the 6,350 acres of initial work 7,570 man days were required to destroy 842,425 Ribes, and on the 346 acres of reeradication which was cut-over land, 585 man days were needed to destroy 92,130 bushes, most of which were small. In most instances the virgin timbered areas supported light to medium Ribes populations and offered the eradicators no serious problems. On the other hand, the heavy Ribes populations and the dense brush cover on the logged-over lands greatly impaired the speed of the crews.

A small but very troublesome area of initial work at Crane Flat proved to be the most costly and the most difficult task of manual Ribes eradication ever encountered in stream type. "Tree sized" Ribes nevadense bushes grew in dense thickets of willow, hazel, and cherry amongst large rocks and under piles of logging debris. This combination of factors presented a Ribes eradication problem that could not be solved by any known mechanical methods, so that all work had to be done by hand.

The small reeradication area lay adjacent to the initial, and except for patches of small Ribes bushes and heavy brush cover, offered no special

problems to the eradicators. Most of the block-out acreage was found on the south and west facing slopes north of the Merced River. In a few sections only the streams and two or three isolated spots had to be worked by the eradication crews, the remainder being Ribes free. The terrain between the Wawona Tunnel and Grouse Creek and in the lower Cascade and Tamarack Creeks was steep and rough. The cliffs bordering the canyon of the Merced River were the only places in Yosemite National Park where rope work was required.

Sequoia National Park

The two camps in Sequoia National Park treated initially 3,000 acres which required 2,262 man days to destroy 359,333 Ribes. The steep slopes studded with huge boulders and cliffs lying between the Marble Fork of the Kaweah River and the Generals Highway handicapped the progress of the work. On a strip along the river men had to be suspended by ropes to reach Ribes plants on the steep slippery banks and cliffs. The eradication of Ribes found growing from the cliffs and boulders also required considerable rope work. Frequently Ribes grew in rock crevices and their removal required much time. A combination of two factors, very steep slopes and the shifting character of the soil, resulted in two or three crowns forming on many Ribes plants, a condition which complicated the grubbing problem.

Ribes tularense was found for the first time growing south of the Marble Fork of the Kaweah River near the Generals Highway (Section 12, T 16 S, R 29 E). The crews destroyed an estimated total of 350 plants found in three small patches, but the count was not kept separate from R. roezli, for the men confused the two species. Large R. cereum bushes growing in clumps were found west of Red Fir. They were not destroyed but were left until the positive degree of susceptibility of this species to blister rust has been determined. The north-facing slopes above the river supported unusually heavy Ribes populations for mature timber type.

In Sequoia National Park, one checker, trained in advance of the eradication job, carried on post and regular checking except during a two-week period when two men had to be used to bring the regular checking up to date. During the periods when no regular checking was needed, post checks were made of the 1939 eradication area which indicated that there was very little Ribes regeneration taking place. Regular checking covered 1,443 acres and post checking 3,084 acres. As a good reserve of advance checking was on hand, none was attempted during the season.

Statistical Summaries

Results of the season's work and general summaries of control work to date in the national parks are presented statistically in the accompanying tables.

Table 1 is a summary of Ribes eradication by the National Park Service in 1942 and also is a summary of Ribes eradication work on national park land. Table 2 is a summary of Ribes eradication by the National Park Service from 1933 to 1942. As indicated by the footnotes in this table, the data for the initial and second eradications performed on the Carl Inn Acquisition area before 1939 will not be found in this table, as it includes only the work actually done by the National Park Service. However, a complete picture of the status of Ribes eradication on the national park land will be found in Table 4.

FINANCIAL STATEMENT

The National Park Service expended in this Region in 1942 a total of \$83,929 of which \$60,080 was expended for blister rust control by Yosemite National Park, \$19,675 for blister rust control by Sequoia National Park, and \$4,174 for supervision, equipment, and supplies by the San Francisco Regional Office.

RECOMMENDATIONS

Yosemite National Park

In Yosemite National Park in 1943 emphasis should be placed on Ribes reeradication on logged-over lands, especially those in the vicinity of Crane Flat Wawona, and South Entrance. Since the new bushes on these areas showed rapid development last season and are beginning to produce a little seed, they should be destroyed as soon as possible. If the needed reeradication is completed in one season, it will be necessary to have two 66-man camps, one at Crane Flat and one at Wawona. The latter can probably be operating by April 15, provided the snow pack is not above that of a normal year. If the old Wawona CCC camp is not occupied by a Civilian Public Service group, it will make an ideal location for a blister rust camp. A portable mess hall and about six additional tent platforms will be needed if the Wawona camp is not available.

The 1943 Ribes eradication program in Sequoia National Park should continue work on areas adjacent to those treated in 1939 and in 1942 on the north side of the Marble Fork of the Kaweah River. Red Fir is still a satisfactory location for a 66-man camp. As the only source of labor will be the high schools, the opening of the camp will be regulated by the date school vacations begin.

TABLE #1

SUMMARY OF RIBES ERADICATION BY THE NATIONAL PARK SERVICE IN 1942*

National Park	Acre		8-Hour Man Days		Per Acre Worked	
	Worked	Blocked Out	Total	Total Ribes Eradicated	8-Hour Man Days	Ribes
Initial Work						
Yosemite	6,350	3,839	10,189	7,570	842,425	1.19
Sequoia	3,000	-	3,000	2,262	359,333	0.75
Total - -	9,350	3,839	13,189	9,832	1,201,758	1.05
Reeradication						
Yosemite	346	-	346	585	92,130	1.69
All Workings						
Yosemite	6,696	3,839	10,535	8,155	934,555	1.22
Sequoia	3,000	-	3,000	2,262	359,333	0.75
Total - -	9,696	3,839	13,535	10,417	1,293,888	1.07

*This table is also a summary of Ribes eradication on National Park Land in 1942.

TABLE #2

SUMMARY OF RIBES ERADICATION BY THE NATIONAL PARK SERVICE 1933-1942

National Park	Acre		8-Hour Man Days	Total Ribes Eradicated	Per Acre Worked		Ownership Status				Acres Ribes-free at time of Re-eradication	
	Worked	Blocked Out			Total	8-Hour Man Days	Ribes	Acres Covered		8-Hour Man Days		
								Federal	Private	Federal		Private
Initial Work												
Crater Lake	406	3,226	3,632	412	130,162	1.01	321	3,632	412	130,162		
Lassen Volcanic	5,722	8,168	13,890	5,270	715,338	0.92	125	13,750	5,215	700,361	14,977	
Yosemite*	42,506	6,536	49,042	78,872	10,458,714	1.86	246	49,042	78,872	10,458,714		
Kinze Canyon	3,241	-	3,241	5,132	836,010	1.58	258	3,241	5,132	836,010		
Sequoia	7,656	-	7,656	7,251	990,417	0.95	129	7,656	7,251	990,417		
Total - - -	59,531	17,930	77,461	96,937	13,130,641	1.63	221	77,321	96,882	13,115,664	14,977	
Reeradication												
Crater Lake	350	-	350	81	13,430	0.23	38	350	81	13,430		795
Yosemite**	7,732	-	7,732	11,781	1,998,400	1.52	258	7,732	11,781	1,998,400		3,927
Total - - -	8,082	-	8,082	11,862	2,011,830	1.47	249	8,082	11,862	2,011,830		4,722
All Workings												
Crater Lake	756	3,226	3,982	493	143,592	0.65	190	3,982	493	143,592		795
Lassen Volcanic	5,722	8,168	13,890	5,270	715,338	0.92	125	13,750	5,215	700,361	14,977	-
Yosemite	50,238	6,536	56,774	90,653	12,457,114	1.80	248	56,774	90,653	12,457,114		3,927
Kinze Canyon	3,241	-	3,241	5,132	836,010	1.58	258	3,241	5,132	836,010		-
Sequoia	7,656	-	7,656	7,251	990,417	0.95	129	7,656	7,251	990,417		-
Total - - -	67,613	17,930	85,543	108,799	15,142,471	1.61	224	85,403	108,744	15,127,494	14,977	4,722

*In addition, 8,206 acres, 5,577 man days, and 1,711,851 Ribes on lands worked by the U. S. Forest Service and the Bureau of Entomology & Plant Quarantine are now in Yosemite National Park.

**In addition, 480 acres, 326 man days, 298,657 Ribes on lands worked by the Bureau of Entomology & Plant Quarantine are now in Yosemite National Park.

TABLE #3

SUMMARY OF REGULAR, ADVANCE, AND POST CHECKING ON THE NATIONAL PARK SERVICE PROJECT - 1942

Operation	Regular Check			Advance Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days
California												
Yosemite National Park	8,855	4.8	167 4/8	6,419	4.1	111 3/8	-	-	-	15,274	4.5	278 7/8
Sequoia National Park	1,443	4.8	41 5/8	-	-	-	3,084	4.1	33	4,527	4.3	74 5/8
Total	10,298	4.8	209 1/8	6,419	4.1	111 3/8	3,084	4.1	33	19,801	4.4	353 4/8

TABLE #4
(Omnibus Table #4A)

SUMMARY OF RIBES ERADICATION ON NATIONAL PARK LAND 1933-1942 (INCLUSIVE)

National Park	Acreage of White Pine In Net Control Area	Net Control Area		Initial Eradication Work			
		Total Acreage (W.P. & Prot. Zones)	Acreage Not Yet Worked Initially	Gross Acreage Reported Initially Worked	Net Acreage Worked In Control Area	Gross Number Wild & Cultivated Ribes Destroyed	Gross Number 8-Hour Man Days
Crater Lake	3,782	3,782	150	3,632	3,632	130,162	412
Lassen Volcanic	17,792	17,792	4,042	13,750	13,750	700,361	5,215
Yosemite	120,620	120,620	63,372	49,042	57,248	12,170,565	84,449
Kings Canyon	22,430	22,430	19,189	3,241	3,241	836,010	5,132
Sequoia	82,678	82,678	75,022	7,656	7,656	990,417	7,251
Total - - -	247,302	247,302	161,775	77,321	85,527	14,827,515	102,459

National Park	Reeradication Work				Total			
	Gross Acreage Reported Reworked	Net Acreage Reworked In Control Area	Gross Number Wild & Cultivated Ribes Destroyed	Gross Number 8-Hour Man Days	Gross Initial and Reworked Acreage Reported	Net Acreage Initial and Rework	Gross Number Wild & Cultivated Ribes Destroyed	Gross Number 8-Hour Man Days
Crater Lake	350	350	13,430	81	3,982	3,982	143,592	493
Lassen Volcanic	-	-	-	-	13,750	13,750	700,361	5,215
Yosemite	7,732	8,212	2,297,057	12,107	56,774	65,460	14,467,622	96,556
Kings Canyon	-	-	-	-	3,241	3,241	836,010	5,132
Sequoia	-	-	-	-	7,656	7,656	990,417	7,251
Total - - -	8,082	8,562	2,310,487	12,188	85,403	94,089	17,138,002	114,647

PART VI

BLISTER RUST CONTROL BY THE OREGON AND CALIFORNIA REVESTED LANDS ADMINISTRATION FINANCIAL PROJECT BLR-6

By

Douglas R. Miller, Associate Forester

PURPOSE

The purpose of this project is to protect from white pine blister rust the white pine stands growing on the lands administered by the Oregon and California Revested Lands Administration of the United States Department of the Interior.

COOPERATIVE AGREEMENT

A cooperative agreement between the Oregon and California Revested Lands Administration and the Bureau of Entomology and Plant Quarantine was necessary since the Bureau is charged with the responsibility of leadership in the general program of blister rust control and in the technical phases of control on lands of all classes of ownership throughout the white pine growing regions of the country. The Bureau is also responsible for the coordination of the efforts of all agencies undertaking control work.

A memorandum of understanding between the two agencies became effective June 28, 1941 and on April 27, 1942 it was extended to cover the fiscal year of 1943. This memorandum outlined the functions and activities of the Bureau regarding blister rust control work to be conducted by the O and C Administration in the protection of white pine on their lands. Briefly these are: to assist in the preparation of a unified control plan for O and C lands; to conduct disease surveys; to define control standards; to conduct preeradication surveys and all kinds of checking work; to correlate, compile, and maintain regional records; to keep the O and C informed on (1) the relative urgency of areas to be worked from the standpoint of blister rust spread and development, (2) the best methods of Ribes eradication for use on specific areas, and (3) any factors affecting the technical application of control operations during their progress; to provide a technical supervisor who will furnish technical advice and will assist in conducting the control program; and to provide the services of a checking supervisor who will have direct charge of the checking and who shall be responsible for the checking work performed. Another function of the Bureau is to select, employ, and pay all checkers. Reimbursement for salaries of checkers for the actual time spent on checking on O and C control units is to be made by the Oregon and California Revested Lands Administration to the Bureau.

This agreement covers only those functions delegated to the Bureau. In applying this agreement members of the two agencies, in joint consultations, determine which areas are to be treated, the location of the camps, and the policies to be followed in conducting the field work. The O and C Administration is responsible for the establishment and operation of their camps.

LOCATION AND ORGANIZATION OF CONTROL WORK

The field work of the O and C blister rust control program was organized and furnished technical supervision by the following personnel: the O and C technical supervisor, Mr. Ross A. Youngblood, who had direct charge of both the Ribes eradication and the reconnaissance work; the Bureau's operation supervisor, Mr. C. P. Wessela, who furnished technical advice; and the Bureau's checking supervisor, Mr. Lyle N. Anderson, who was directly responsible for the checking work. When Mr. Wessela entered the Army in late September, Mr. D. R. Miller replaced him.

Although the O and C Administration has lands supporting sugar pine on the Umpqua, Rogue River, and Siskiyou National Forests in Oregon, their Ribes eradication work with regular funds was confined to the West Galice Unit (sometimes known as the Bunker Hill Unit) of the Siskiyou National Forest. Initial work, started on this unit in 1941, was continued throughout the 1942 season. Reconnaissance work was done on the Bunker Hill, the Selma, and the Bolan Lake Units of the Siskiyou National Forest, and on the Fredenburg Springs area of the Pinehurst Unit of the Rogue River National Forest.

WORK PERFORMED AND RESULTS ACCOMPLISHED

Ribes Eradication

Ribes eradication work was continued on the West Galice Unit by a 55-man crew during the 1942 season. Soldier Camp on the North Fork of Silver Creek was established during the latter part of May and field work started early in June. Since there was only one road in this area, it was necessary to resort to a pack camp in order to complete the work in the southwest portion of the unit. During mid-July about 20 men were transferred from Soldier Camp to the pack camp on Little Silver Creek. After this area was worked, the pack camp was dismantled and the men were returned to the parent camp which, in the meantime, had been moved to Peavine. Work from this location (on the east side of the unit) was continued until September 15 when the student labor had to return to school.

Although the project opened with 55 men, it was impossible to maintain that strength because men quit to take higher paying jobs. Few replacements were available, and as a result, the end of the season found only 20 men left in camp.

The area covered by Ribes eradication crews during 1942 lies in the north-eastern part of the forest. The terrain is as rugged as any found on other control units within the Sugar Pine Region. The medium to dense brush cover found beneath the stands of mature sugar pine increased the difficulty of getting laborers over the area. The territory, however, had one compensating factor: Ribes bushes, except along the streams, were few in number and were often absent from comparatively large areas. About two thirds of the area examined this year was found to be free of Ribes, and hence was eliminated from crew work.

The eradication of 69,075 Ribes bushes from the 8,066 acres examined required the use of 1,573 man days. Of the Ribes removed one third was R. bracteosum, the most rust-hazardous species in the Sugar Pine Region. This control unit is receiving treatment none too soon, as two blister rust infection centers on sugar pine have been located within its boundaries. The diseased trees were removed at the time of their discovery.

A small control unit was established in Section 21, T 27 S, R 11 W on the Siuslaw National Forest for the protection of the sugar pine seedlings being grown in the O and C McKinley Nursery. Work was started on this unit during June 1942 with labor secured from the McKinley CCC Camp. The work was discontinued June 30 when the CCC program was terminated. Ribes eradication on the area was not completed, and as a result the nursery is not safe from blister rust invasion. Two infected Ribes sanguineum bushes were located just outside the control boundaries. There were 222 man days used in removing 5,754 Ribes, 3,383 of which were R. bracteosum. Of the 297 acres in the unit, only about 80 have the Ribes completely removed.

Sugar Pine Reconnaissance

The Oregon and California Revested Lands Administration made an examination of the available information pertaining to their blister rust control units and found that the data for some units or portions of units were insufficient for the proper planning of a Ribes eradication program. As a result of this survey, a seven-man reconnaissance party was organized. Work was started on the Reuben Mountain area early in May. When the Ribes eradication camp opened on Silver Creek, information about the timber on that area was needed immediately so that the control boundaries could be definitely established. The reconnaissance crew was transferred to that camp and the necessary data were collected. When this work was finished, the crew was moved to the eastern portion of the West Galice Control Unit. The reconnaissance crew covered about 8,000 acres from this camp.

After completing the work on the Peavine area the camp was moved to the Bolan Lake district on the southern end of the Siskiyou National Forest. Over 10,000 acres of land supporting mature timber stands were covered from this location. The camp was then moved to the Fredenburg Springs area of the Pinehurst Unit on the Rogue River National Forest, where data were taken on 10,000 acres. This country surrounds Little Chinquapin Mountain and supports a good stand of mature timber. The next move was to the Selma country which lies just east of the Siskiyou National Forest and adjoins the southern end of the Selma Control Unit. The field season was terminated early in September when the student workers returned to school. Nearly 6,000 acres were sampled by the reconnaissance crew during its stay on the Selma area.

The reconnaissance party, financed and supervised by the O and C Administration, took sample Ribes and sugar pine data on 46,480 acres during the 1942 season. All O and C lands needing additional information were not covered by the reconnaissance crew. Enough areas were sampled, however, to take care of the needs of the Ribes eradication program as now outlined for the next two years. The rest of the sampling work should be completed as soon as possible.

Checking

The checking organization and methods used during the 1942 season remained unchanged from those of previous years. An average of three checkers was stationed on the O and C project throughout the summer. The actual number varied with the status of the checking needs and as many as six were used for one two-week period.

Each section was advance-checked before the Ribes eradication crews started work. About 2,500 acres that had received an advance check during 1941 were ready for the 1942 season, and an advance check was conducted on 6,536 acres

in 1942. Since 8,066 acres were either blocked out as being "Ribes free" or were covered by the eradication crews during the season, about 1,000 acres which have already received an advance check remain to start the 1943 season. A regular check was performed on 2,081 of the 2,194 acres actually covered by Ribes eradication crews.

Tables 1 to 4 present the results of this and past seasons' work in detailed form. These tables cover Ribes eradication work, ownership status, and checking.

FUNDS EXPENDED

The O and C Administration expenditures from regular funds for Ribes eradication, checking, and reconnaissance work during the calendar year of 1942 were \$34,215.11. In addition, CCC work valued at \$1.50 per effective man day amounted to \$333.00.

CURRENT STATUS OF THE PROJECT

There are 247,047 acres within the present blister rust control units on the Siskiyou National Forest, 34,700 acres on the Rogue River National Forest, and 12,316 acres on the Umpqua National Forest which have sufficient O and C lands interspersed to warrant protection by that agency. Of these 294,063 acres, 85,281 acres or 29 per cent have already received one or more treatments. This leaves 208,782 acres or 71 per cent yet to be protected. If the O and C Administration assumes the responsibility of blister rust control on all that acreage, then about one third of their initial job has been completed.

RECOMMENDATIONS FOR FUTURE WORK

The Ribes eradication program should be completed as soon as possible as blister rust is becoming established at some of the sites where conditions are highly favorable to rust development. Since the treatment of all areas within the near future is impossible under wartime conditions, the amount of work that can be done should be conducted on those sites which will give the greatest amount of protection to the area as a whole.

It is recommended that both cankers and Ribes be removed from all known infection centers to prevent a rapid development of the disease. It is also recommended that all bushes of R. bracteosum be removed from within the control unit boundaries and from a one-mile zone outside the control unit. The use of these two methods should keep the rust sufficiently controlled during the next few years to allow the completion of the entire control program before serious damage occurs.

TABLE #1
SUMMARY OF RIBES ERADICATION BY THE OREGON & CALIFORNIA REVESTED LANDS ADMINISTRATION IN 1942*

Control Operation	Fund	Acres		8-Hour Man Days	Total Ribes Eradicated	Per Acre Worked 8-Hour Man Days	Acres Covered			Ownership Status			Ribes Eradicated					
		Worked	Blocked Out				Total	National Forest	Private	Total	National Forest	Private	Total	National Forest	Private	Total		
Initial Work																		
Stakron N. F.	Reg.	2,194	5,872	8,066	1,573	69,075	0.72	31	4,665	3,401	8,066	745	1,573	-	37,802	31,273	69,075	-
Siuslaw N.F. -																		
Nursery Sanitation	CCC	80	-	80	222	5,754	2.78	26	-	40	40	111	111	111	111	2,877	2,877	2,877
Total - - -	-	2,274	5,872	8,146	1,795	74,829	0.79	33	4,665	3,441	8,106	856	1,684	111	37,802	34,150	71,952	2,877

*This table is also a summary of work done on O & C land in 1942.

TABLE #2
SUMMARY OF RIBES ERADICATION BY THE OREGON & CALIFORNIA REVESTED LANDS ADMINISTRATION 1940-1942

Control Operation	Acres		8-Hour Man Days	Total Ribes Eradicated	Per Acre Worked	Omerahip Status															
	Worked	Blocked Out				Total	Acres Covered			8-Hour Man Days			Ribes Eradicated								
							National Forest	O & C	Total	National Forest	O & C	Total	National Forest	O & C	Total						
																Federal	Private	Federal	Private	Federal	Private
Initial Work																					
Stakron N. F.	6,185	10,464	16,949	5,157	398,895	0.83	64	6,846	8,551	15,397	1,252	1,873	3,018	4,891	266	156,267	229,505	385,772	13,123		
Siuslaw N.F. -																					
Nursery Sanitation	80	-	80	222	5,754	2.77	72	-	40	40	40	-	111	111	111	111	156,267	232,182	2,877		
Total - - -	6,265	10,464	16,729	5,379	404,649	0.86	65	6,846	8,591	15,437	1,292	1,873	3,129	5,002	377	156,267	232,182	388,649	16,000		

TABLE #3

SUMMARY OF REGULAR, ADVANCE, AND POST CHECKING ON THE
OREGON AND CALIFORNIA REVESTED LANDS ADMINISTRATION PROJECT - 1942

	Regular Check			Advance Check			All Checks		
	Acres Covered By Final Check	Per cent of Check	Man Days	Acres Covered	Per cent of Check	Man Days	Acres Covered	Per cent of Check	Man Days
Siskiyou National Forest	2,081	6.1	79 1/8	6,536	5.4	125 7/8	8,617	5.6	205

TABLE #4
(Omnibus Table #4A)

SUMMARY OF RIBES ERADICATION ON O & C LAND 1925-1942 (INCLUSIVE)

Control Operation	Acreage of White Pine in Net Control Area	Net Control Area		Initial Eradication Work*			
		Total Acreage (W.P. & Prot. Zones)	Acreage Not Yet Worked Initially	Gross Acreage Reported Initially Worked	Net Acreage Worked In Control Area	Gross Number Wild & Cultivated Ribes Destroyed	Gross Number 8-Hour Man Days
Rogue River				5,394	5,394	196,371	1,154
Siskiyou				28,090	28,090	403,922	6,938
McKinley Nursery				40	40	2,877	111
Total - - -	129,709	129,709	96,185	33,524	33,524	603,170	8,203

*No reeradication work has been done.

PART VII

SCOUTING AND DISEASE SURVEY

By

Douglas R. Miller, Associate Forester

Scouting for white pine blister rust, Cronartium ribicola, in Oregon and California has to start anew each year, although the objectives from season to season remain about the same. The aim of the 1942 scouting program was threefold: first, to ascertain if a long-distance spread of the rust had occurred from aeciospores produced in the north; secondly, to determine the amount of intensification of the rust in those areas previously infected; and thirdly, to retard the development of the rust as much as possible by eliminating all cankers located as well as by recommending that certain local areas which present conditions highly favorable to the incidence and development of the rust receive Ribes eradication immediately.

The status of the known spread of blister rust at the beginning of the 1942 scouting season in the Sugar Pine Region was as follows:

Oregon

Blister rust was discovered in Oregon in 1925, and since then has spread southward until in 1936 it was located on sugar pines and Ribes in the northern end of the sugar pine belt. By the end of 1941, infection centers had been found throughout the western white and sugar pine stands of both the Coast and Cascade Ranges. The disease was not uncommon on the Umpqua, Rogue River, and Siskiyou National Forests at those locations which were particularly favorable to its incidence and development. In 1941 blister rust was found for the first time (on both pines and Ribes) in Crater Lake National Park.

California

Blister rust was discovered in California in 1936. The infection was found on both sugar pines and Ribes along a narrow belt lying just south of the Oregon line on the Klamath National Forest. Since weather conditions during the spring of 1937 were favorable to aeciospore dissemination as well as to Ribes infection, the rust spread southward for a distance of 120 miles to the southern end of the Cascades and the northern end of the Sierras and 125 miles in the Coast Range. The spring of 1938 was another good period for aeciospore dissemination as well as Ribes infection; however, the greater volume of spores was apparently borne by wind currents to the Sierra Nevada Range. As a result, infection on Ribes was found 160 miles south of the Oregon line at Cascade on the Plumas National Forest. Blister rust infection on Ribes in 1939 was confined to the vicinity of the only known sporulating cankers in California which were in the infection area at the East Fork of Indian Creek on the Klamath National Forest.

Climatic conditions during the spring of 1940 were favorable to rust development; but, as in 1939, there was no long-range spore dispersal, which resulted in a total lack of *Ribes* infection except in the vicinity of the sporulating cankers on the Klamath National Forest. An examination of the sugar pines on areas where *Ribes* infection had been found during 1937 and 1938, however, revealed diseased pines at Montgomery Creek, which lies between the Shasta and Lassen National Forests, at Viola on the Lassen National Forest, and at fourteen points on the Klamath National Forest. These discoveries extended the known range of blister rust infection on sugar pines to 42 miles south of the Oregon line on the Klamath National Forest and to 107 miles on the Lassen National Forest.

Climatic conditions during the spring of 1941 were particularly favorable to the development of the rust on *Ribes*; but, as in the two previous years, no long-distance spread had occurred from aeciospores produced in the north. Numerous cankers (of 1937 origin) on sugar pines on the Klamath National Forest produced aeciospores for the first time, resulting in much local infection of *Ribes*. Summer rains caused a tremendous spread of the rust from bush to bush on *Ribes sanguineum* in the Hungry Creek area. Sporulating cankers on sugar pines were located at several of the infection centers in the Montgomery Creek area just north of the Lassen National Forest. Sporulating cankers were also located at both the South Branch of the Middle Fork of the Feather River and Lost Creek on the southern end of the Plumas National Forest. Two nonsporulating cankers found on a sugar pine tree on Sly Creek not only extended the known limits of infected sugar pines about 60 miles farther south, but also advanced the known infection zone for either host about six miles deeper into the sugar pine stands of the Sierra.

Three bushes of *R. menziesi* infected with blister rust were found on the Navarro River in southern Mendocino County near the coast and about 200 miles south of the Oregon line. The discovery of the disease on the Navarro River extended the known range of blister rust about 75 miles farther south along the coast. There was no white pine in the vicinity of this southernmost infection center.

A resume' of the status of the rust in California at the end of 1941 is as follows:

1. The Sierra Nevada

- a. On sugar pine 165 miles south of the Oregon line.
- b. On *Ribes* 160 miles south of the Oregon line.

2. The Coast Range

- a. On sugar pine 42 miles south of the Oregon line.
- b. On *Ribes* 200 miles south of the Oregon line.

ORGANIZATION AND METHODS OF WORK

The scouting organization during the 1942 season consisted of a project leader and from one to six assistants. In addition, members of the Division of Forest Pathology and of the blister rust personnel of all agencies on the various operations both in Oregon and California made observations along with their other duties.

The mechanics of scouting used in 1942 were about the same as those described in the 1940 and 1941 Annual Reports. Data pertaining to the infection of both Ribes and pines, as well as canker analysis information, were taken as in the past. Again, much stress was placed on locating areas favorable to the incidence and development of the rust. When a spot was located which had (1) a suitably sized opening in both the timber and brush canopy, (2) the proper exposure, (3) surface moisture present, (4) numerous Ribes bushes and young sugar pines growing at the margins, and (5) a location within the proper altitudinal range, much time was spent in examining the pines and Ribes growing on it.

The one new scouting procedure added was a combination of pruning all pines examined and of removing all cankers found. This policy was adopted for the following reasons:

1. It facilitated scouting.
 - a. It was always possible for one scout to tell whether or not a tree had been examined by another member of the crew.
 - b. It afforded the project leader a means of checking the efficiency of the scouts.
 - c. After a tree had been pruned, the remaining crown was more easily examined.
2. By following this procedure, many small inconspicuous cankers that might otherwise have been missed were removed.
3. Pruning removed the most hazardous-to-rust portion of the crown and thus decreased the probabilities of future infection of that tree.
4. All cankers and damaged trees were removed to free the stand of infection and to reduce the amount of damage from those cankers now present.
5. The volume of aeciospores produced each spring will be curtailed resulting in a direct reduction of potential Ribes infection.
6. This procedure improved the quality of the trees left.

WORK PERFORMED AND RESULTS OBTAINED

A review of the charts of upper air currents and other meteorological records covering the Pacific Coast for the spring months of 1942 was made by Drs. W. W. Wagener and J. L. Mielke of the Division of Forest Pathology. They state: "From the examination of the upper air records, it appeared that there had been no periods of wind movement this spring which could be regarded as favorable for spore carriage and accordingly no extension of the range of the rust this year appears probable. In addition to the absence of favorable wind periods, the cool, moist weather in Oregon and northern Idaho during the spring was not favorable for the maximum discharge of spores from rust cankers and in California the coolness of the spring months delayed the start of leaf growth on Ribes."

With one exception, extensive scouting revealed Ribes infection only in the vicinity of sporulating cankers. This isolated case occurred on Brush Creek in the southern portion of Mendocino County. It is probable that the rust overwintered on Ribes at Brush Creek; and if this proves to be correct, no exception will have occurred. If overwintering did not occur, it is quite likely that the Ribes-infecting spores came from infection centers on the Klamath National Forest which would still mean that no long-distance spread of the rust had occurred from aeciospores produced in the north.

Oregon - Scouting on the Umpqua National Forest

The lower portion of Dumont Creek, an old logging road, the Radford Ranch road and the Red Butte road were scouted for blister rust on September 25 by Ross A. Youngblood of the Oregon and California Revested Lands Administration and Douglas R. Miller. Dumont Creek was the only area where the disease was located. Ribes and sugar pines along this stream were generally scarce; however, an occasional pocket of each was encountered. There were no areas particularly favorable to the development of the rust located along any of the roads. Of 480 sugar and white pines examined, 5 trees were infected and had 9 cankers some of which had sporulated. There were 6 out of 30 R. sanguineum lightly infected but none of the 15 R. lobbi were diseased. All infected bushes were within 200 feet of sporulating cankers. This portion of the Umpqua National Forest should have a thorough examination as soon as possible.

Scouting on the Rogue River National Forest

At the request of C. P. Wessela, the scouting crew, consisting of Eldon P. Hughes and Miller (and later joined by L. P. Winslow) proceeded from California to the Rogue River National Forest during the second week of August. The Mount Stella area was the first one examined. At this infection center 23 sugar pines and 19 western white pines were found to be infected, and 309 cankers were removed. An analysis of the cankers indicated that the infection was of 1937 origin. In 1938, one year after blister rust had become established, this area received initial Ribes eradication. Some Ribes regeneration was occurring and 16 of the 94 bushes examined were found to be infected. The area received another treatment of Ribes removal immediately after the scouting work was completed. Because the Ribes were comparatively numerous on this area before the initial control treatment was given, it afforded an excellent site for the incidence and development of the rust. The 1938 Ribes eradication work apparently prevented a further build-up of the rust as no incipient cankers were found. Although the rust is now well under control on Mount Stella, the area should be carefully watched for the next few years to be sure that no damage results from the Ribes infection which occurred this year.

Scouting along Buck Creek (West Fork of Muir Creek) revealed a light pine infection inside the control unit boundary and a heavy infection just outside where the Ribes had not been removed. Since the numerous Ribes just outside the control unit (including many clumps of R. bracteosum) were not scheduled to be removed and since western white pines were common on the flat along the stream, all white pines (regardless of whether or not they were infected) under 14" DBH were removed. This procedure will keep the rust under control on this area as well as prevent large quantities of aeciospores from being produced and then disseminated into the adjoining stands of pine within the control unit.

The Ribes were removed from the area within the control unit in 1935 and again in 1938. The initial infection appears to be of 1937 origin; however, juvenile and incipient cankers of 1940 and 1941 origin respectively were located outside the control unit. This area affords an outstanding example of the protection given to a white pine stand by removing the Ribes before the rust was present. Those cankers within the control unit were in the proximity of the unit boundary and were probably caused by infected Ribes bracteosum growing just outside the control boundary.

Infected white pines were located along Buck Creek from a point 10 chains within the control boundary to a distance of over two miles outside the unit. Infection on Ribes extended up the stream about one mile beyond that found on pines. One R. erythrocarpum bush was found infected with blister rust. This was the first time the species had ever been found infected under natural conditions. There were 190 diseased white pines removed with a total of 1,583 cankers.

The Buck Basin area, lying in the headwaters of Jim Creek, was next examined and heavily infected pines were found at one place. Here, again, the initial infection was of 1937 origin whereas the first Ribes eradication work was performed late in the fall of 1938. The infected pines on this area were within an old burn which now supports a stand of white pine reproduction. At the time of infection, numerous large R. sanguineum bushes were growing throughout the reproduction, particularly on and near the stream affording good host association for the incidence and development of the rust. Both white and sugar pines were present, the former predominated in number along the stream and for the first chain or two up the slope. Sugar pines then began to replace the white pine and at a distance of 6 to 10 chains up the hillside, few, if any, white pines were to be found. Since white pines were more numerous along the stream bottom and adjacent slopes (where Ribes were more prevalent and conditions for infection were generally more favorable) this species received the majority of the infection. Most of the cankers at this location had sporulated. Because control treatment was done late in the fall of 1938 after many bushes were defoliated, a thorough job of Ribes eradication was not secured; as a result, cankers of 1940 and 1941 origin were present. The area was worked again in 1942 and since all known infection was eliminated, the intensification of the rust should now be checked for a period of several years. A total of 1,503 cankers were removed from 439 trees on this area.

There were 83 cankers found on 41 western white and sugar pine in the vicinity of the McCall Creek campsite. The main infection center was located along the road where young sugar pine trees were abundant. Only a few diseased white pines were found and they were growing along the stream. This area received its initial Ribes eradication in 1939 while the infection was of 1937 origin. A few Ribes were located along the stream and road, but the area was comparatively free of Ribes. One thrifty R. cruentum bush about three years old growing beside the road was practically defoliated by the rust. This was the only infected bush found. No incipient cankers were located which indicated that the 1939 Ribes eradication job had given the area good protection.

The area along Rabbitears Creek was another good example of how the rust acts inside and outside a treated area. That portion of the stream inside the control unit had the Ribes removed in 1935 and again in 1937. An occasional bush of R. bracteosum was found in the treated area along with an occasional canker

on white pine. Just outside the control area a concentration of infected pines was found. It also appeared that sporidia produced on Ribes bracteosum growing outside the control unit had infected white pines growing in a burned-over area several chains up the hillside and located just inside the control boundary.

Another infection center of particular interest was the one along lower Foster Creek near its confluence with Hershberger Creek. This area originally supported a heavy concentration of Ribes, which was removed in 1935 and the area reworked in 1937. During this time, however, enough Ribes were present to cause a light infection of pine, as an occasional canker was located. Considerable regeneration of Ribes had occurred since the last work was done, and of the six species present, including R. bracteosum and R. cruentum, the bushes of R. triste were the most heavily infected both in percentage of bushes and percentage of infected leaf surface per bush. Areas supporting the most Ribes along these streams received a third working during the fall of 1942.

A few infected white pines were located on Flat Creek in the vicinity of Hard Luck Camp. The Ribes had been removed in 1938 which was one year after the infection had become established. While only an occasional pine grew along the stream bottom, most of them were infected. Infection was found on pine along the trail 3 to 6 chains above the stream. Here again it appeared that sporidia from R. bracteosum growing along the stream had caused the infection of the white pines on the adjacent slope.

Blister rust was discovered on Ribes on Little Chinquapin Mountain, which is situated toward the southern end of the forest. Four lightly infected R. lobbi bushes were located but a diligent examination of the surrounding sugar pine failed to reveal any cankers. Since the infected Ribes were located at the margins of small openings in the timber, it appears that the infecting aeciospores were blown in rather than produced locally. Although this area is within a control unit, it has not received control treatment. The Ribes-infecting spores could have come from the Tub Springs infection center which is only about six miles southwest of this area. The diseased bushes were destroyed.

The Tub Springs infection center which lies outside the control unit was examined and all the cankers found were removed. Sugar pines at the Spring and along the small stream below were few in number. Sugar pines were more numerous on the adjoining slopes but the Ribes became less common as the slopes were ascended. Since this is the largest known infection center on the southern end of the forest it should be kept under control so as not to subject the pine on the adjacent control unit to unnecessary exposure from aeciospores produced here.

The scouting crew also located blister rust on pines on upper Foster Creek, at the rock quarry by the side of the Diamond Lake road, and on Wizard Creek. A scouting party composed of Lyle W. Anderson, Charles R. King and Winslow spent the last ten days of September in the Upper Rogue River country. Blister rust was found on pines at the confluence of Prairie Creek and Rogue River as well as on the river about a mile below. It was also located on Copeland Creek, on Bybee Creek at Cow Camp, on Red Blanket Creek at Getz's Mill, on Barr Creek in the vicinity of Mooney, on the Middle Fork of the Rogue River from the bridge to the dam, on Wizard Creek below the falls, and

at Imnaha Guard Station. This latter infection center is outside of the control unit. Only a light infection existed at each of the above centers but they must be examined periodically in order to control the rust.

Two other infections were located on this forest by Youngblood and Miller. One was along Vine Maple Creek where both Ribes and sugar pine are scarce; hence, only a few infected pines and Ribes were found. The other center was located on the Fredenburg Lookout road in an old burn near the ridge top. While Ribes are numerous on this area sugar pine reproduction is somewhat scattered. The young sugar pine trees ranging from 6 to 14 years old are making excellent height growth as some 10-year old trees were examined, which were 8 feet tall and had 16 to 18 inch leaders for this year. The rust originally became established here about 1937 as one tree with an old canker was found; however, most of the trees examined were found to be infected with incipient cankers of 1941 origin. Although this area is an excellent sugar pine site, it is comparatively small in extent and is outside present control boundaries. Since it lies on a ridge top, the spores are particularly subject to long-distance dissemination making this an exceptionally bad spot from the control standpoint. Because of this danger, the area should be thoroughly examined as soon as possible and all infected sugar pines removed. This is another example where Ribes eradication outside the control unit appears to be justified in order to keep the rust under control in a region until all pine stands within the control units are fully protected.

Scouting on the Siskiyou National Forest

Scouting by Shollenburg and Kelly revealed the rust on sugar pine at one point on the ridge in the vicinity of Ninemile Lookout. Although six trees with 30 cankers were located Ribes appeared to be entirely absent in the vicinity of the diseased pines. The pine-infecting spores were apparently produced on Ribes bracteosum growing along the streams below.

Early in the season, Wossela and Anderson examined the infection center on the Marial road and late in the fall this area was reexamined by Youngblood and Miller.

The presence of numerous infected pines in an area devoid of Ribes in the immediate vicinity was a situation found to be peculiar to this forest. The trees, regardless of size, had cankers scattered throughout their crowns as flags were seen fifty or more feet above the ground. A few small pines had as many as thirty cankers which would normally indicate that a Ribes bush could be located within a few feet of each diseased tree.

The sugar pines on this area were making rapid growth and the rust was matching it. Nearly all cankers were exceptionally well developed and one tree had two trunk cankers at a point where the bole was 6 inches in diameter. Each of these two cankers was about three feet long, which is exceptionally fast development for cankers of 1937 origin.

The strip of area supporting the diseased sugar pine lies up and down the slope, and is about ten chains wide. The whole setup looked as though fog had passed over infected R. bracteosum bushes (growing along the stream from 20 to 30 chains below) and had become laden with sporidia. As the fog was blown up the hillside these pine-infecting spores were deposited throughout the sugar pine crowns. The extent of this infection center was not

determined as insufficient time prevented a thorough examination of the area. No incipient cankers were found even though some of the diseased trees were cut down and examined limb by limb. The lack of incipient cankers as well as the presence of cankers in all portions of the crowns strengthens the opinion that a comparatively long-distance spread of the rust had occurred from Ribes to pines at the time of the initial infection.

Although this area lies within a blister rust control unit, no Ribes eradication work has been done. Since this infection center is near the top of a ridge, local treatment should be given immediately to prevent further dissemination of aeciospores to the surrounding country. Only a small portion of the infection was removed at the time of the fall examination.

A cursory examination was given the Mt. Reuben infection center by Youngblood and Miller, and it was found that the rust is here beginning to become well established in places in the sugar pine stands. The rust is still localized or in "pockets" and still can be controlled by eliminating the cankers followed by Ribes eradication. If the sugar pine is to be saved, a canker elimination and Ribes eradication program should be started in 1943. The Ribes eradication work could be confined to infection centers, thus keeping the rust in check until a comprehensive control program could be inaugurated. Sugar pine reproduction was common over most of this area while Ribes sanguineum and R. cruentum were sparsely distributed throughout but were more numerous along the roads, streams, and draws.

Scouting up Dutch Henry Trail revealed an infection center beginning at a point about 5 chains from the road and extending along the ridge top for the next 20 chains. The infection was rather heavy in places even though Ribes were absent at these spots. Ribes cruentum and R. glutinosum were growing on the northeast side of the ridge between 5 and 10 chains from the center of the infection area. Since these cankers were scattered at random throughout the sugar pine crowns, a rather long spread of the rust from Ribes to pines was indicated. The pine-infecting spores could have originated on R. bracteosum bushes growing in the stream below. Only a few of the cankers were removed as limited time prevented a complete examination of the area and removal of cankers.

Scouting within the West Galice Control Unit revealed blister rust on sugar pines along the Peavine Trail. Twelve infected trees were located in a small opening in the mature timber. Young pines were not too numerous at this point; numerous R. glutinosum and R. cruentum had been removed by the eradication crews a few weeks before.

An infection center in the Bolan Lake area was located by Youngblood and Miller during the latter part of September. Three infected trees (bearing sporulating cankers) and numerous heavily infected Ribes were found along the trail leading off the Sucker Creek road. The abundance of Ribes bushes and young sugar pine trees afford an excellent association for a rapid development of the rust if control measures are not applied soon. The greater part of the Ribes population appears to be confined to a belt from 40 to 80 chains in width lying along the hillside.

Scouting on the Siuslaw National Forest

The McKinley Nursery was examined by Youngblood and Miller in late September. Scouting was done on both the control unit and the area surrounding it. No rust was found on either sugar pine or Ribes within the control unit. Blister rust, however, was located on Ribes sanguineum just outside the treated area. There are no native white pines in this portion of Oregon.

Ribes eradication was performed by CCC labor in the spring of 1942, but the camp was discontinued June 30 before the job was completed. Several missed bushes were found within the worked area, which should be removed to insure full protection of the sugar pine in the nursery. The R. bracteosum along Mast Creek should be eradicated as it is a potential menace to the pine seedlings.

Scouting on the Klamath National Forest

The infection center on Cottonwood Creek in that portion of the Klamath National Forest which extends northward into Oregon was examined and three sporulating cankers were found. Although many young Ribes bushes were growing in the vicinity of the diseased pines, no rust was found on any of them. The Ribes were removed from this area in 1939, two years after the rust became established.

Scouting on the Crater Lake National Park

Scouting along the rim of the lake where white bark pine and R. erythrocarpum are common associates failed to reveal any rust. The white pines and various species of Ribes on Annie Creek (near its source in sections 6 and 7) were examined with negative results. The lower end of the "panhandle" of the Park, where rust was found last year, was then examined and two bushes of R. inerme were found to be lightly infected.

California - Scouting on the Klamath National Forest

The 1942 scouting season opened when Carl W. Fowler and Douglas R. Miller made a trip to the Klamath National Forest, during the first week of May, to eliminate the blister rust cankers growing on sugar pine at those infection centers which had been located in previous years.

The infection center located on the road leading up the West Branch of Indian Creek lies outside the existing control unit boundaries. Since the area is not to be protected from blister rust most of the young sugar pines were removed to keep the rust in check until nearby control units can be protected. Of the 1,246 cankers removed from 210 sugar pines, all were several years old (apparently of 1937 origin) and 713 of these would have sporulated before the season was over. No incipient cankers were observed, but due to the earliness of the season cankers of 1941 origin would have been extremely inconspicuous. All sporulating cankers were buried.

The infection center on the South Fork of Indian Creek was located by Lachmund and Partington in 1940 and described by them as having over 200 cankers on 50 or more trees. The area was reexamined in 1941 when it was noted that two small sugar pine trees (about three feet high) had been killed by trunk cankers and that the heaviest infection was centered around these

two trees. Of the many cankers examined at that time only one was producing aeciospores. It appears that the two small sugar pines, which are now dead, had been infected some time between 1930 and 1933 and that the resultant cankers had produced aeciospores for the first time in 1937. This was also the year that the general spread of the rust occurred from aeciospores blown down from northern sources so it is possible that the Ribes on this area were reinfected from spores of two sources.

This is a poor site for sugar pine as it is low in elevation (about 1,800 feet) and the soil is shallow and rocky; hence, in general, the trees were making slow growth. Perhaps because the sugar pines were making slow growth, the cankers on them were poorly developed, excessively damaged by insects, and many were on the verge of dying. There were 160 diseased sugar pines found. Of the 602 cankers located 145 were sporulating; and of this number, all except 12 to 15 had only a few small, poorly developed aecia present. The proportion of cankers sporulating as well as the quantity of spores produced by each canker was small as compared with the production at other centers. No incipient cankers were observed.

The infection center on the Slater Butte-Tannen Mountain road was examined both in the spring and in the fall. A large proportion of the cankers were producing aeciospores or had produced them during the spring. Although the infection center was outside a control unit, the cankers were removed along the slope near the ridge top because the area is located where spores could be readily dispersed by wind currents. There were 393 cankers located on 56 sugar pines. Although Ribes bushes were numerous, only 14 out of 230 examined were infected. A few trees ideally situated for rust development supported incipient cankers.

The cankers at the infection center on the Dillon Mountain road were removed early in the spring before many (if any) aeciospores had been liberated. This is a poor sugar pine site, and, as a result, the cankers were poorly developed with only about 20 per cent producing aeciospores. The 98 infected trees had 443 cankers. Sugar pines were numerous but Ribes were confined mainly to the opening along the road. Infected trees were scattered along the road for a distance of two miles or more.

The infection center on the Walker Creek road was examined to see if those suspicious-looking swellings found on sugar pines in 1941 had developed enough to be identified. Two more infected trees with eight cankers were found. Sugar pines are numerous on this area but Ribes are scarce as only 14 were located which included several seedlings coming in along the newly constructed road. A few of the cankers had sporulated but no rust was found on Ribes.

An inspection was made of the infection area along the East Fork of Indian Creek where infected sugar pines had been located in 1936. At that time two infected trees with three old cankers (of 1929 or 1930 origin) and six other trees showing incipient cankers were found. Most of these trees were removed at the time of discovery. When this area was examined in 1937, only one infected Ribes was located. Upon examination of this area in 1938, several infected Ribes were observed as well as numerous infected pines. All the cankers were immature and appeared to be of 1935 and 1936 origin. The intensification of the rust on Ribes was not so heavy as it was in 1936. This area was examined again in 1939 when it was found that a hundred or

more cankers had sporulated. Although Ribes bracteosum inhabits this stream throughout most of its course, blister rust infection on that species in 1939 was relatively light even in the vicinity of sporulating cankers, and practically no rust was found more than a few hundred feet from the cankers. In 1940 the aeciospore production had been greatly reduced when compared with that of the previous year. Ribes infection was limited to about one third of that found in 1939. It was noted that a wave of young cankers had resulted from the 1938 Ribes infection; this wave exceeded in volume all previous years' infection on pines combined. A cursory examination of the area early in the spring of 1941 showed a moderate volume of aeciospores was being produced. Infection on Ribes had insufficient time to develop at the date of this examination; but from observations made elsewhere on the forest, it is probable that blister rust intensification on Ribes at this area was the greatest that it had ever been.

The preceding history helps to explain the heavy intensification of rust on sugar pine found by Anderson and Miller late in the fall of 1942. Many of the smaller pines under 3 feet in height were dead and some trees having a height of seven feet had died during the summer. There had been a good production of aeciospores during the spring months, but due to the lack of the synchronization of factors favorable to rust development, blister rust infection on R. bracteosum in the immediate vicinity of sporulating cankers was generally light. There was an exceedingly heavy pocket of rust on sugar pine close to the section line of 16/21. A particularly heavy wave of infection on pines had occurred in 1941 as thousands of incipient cankers were found. In the heaviest part of the infection center, there were hundreds of incipient cankers per tree. A few trees, up to 15 feet high, had an incipient canker on every twig of every branch. Two trees had over 1,000 cankers each. Several of the trees which supported numerous cankers probably would have been killed before the incipient cankers reached maturity.

Ribes bracteosum (the only Ribes found at this infection center) again proved itself to be the most damaging Ribes species of the sugar pine belt. At the point of heaviest infection, diseased trees were found on a dry, southern, brushy hillside. Upon ascension of this slope every sugar pine within ten chains of the stream and the R. bracteosum were found to be infected and cankers were not uncommon at a distance of 15 or more chains from the creek. No Ribes were located on this dry hillside. An occasional canker on sugar pine as well as an occasional infected bush of R. bracteosum was located from the end of the old logging road on up the stream to where scouting was discontinued. There were 10,596 cankers removed from 214 diseased sugar pines. Not all the cankers were removed from this center as rain and snow terminated the work before all the cankers were removed. The greater part of the job was finished but to keep the rust under control on this area more work should be done during the spring of 1943.

All the principal streams in the Horse Creek Control Unit were examined for blister rust by a crew consisting of Anderson, Zink, Ellis, Howard, Sovulewski, and Miller. Six infection centers were located and examined: five on the streams and one by the side of the Middle Creek road. These centers were small, and, as far as could be determined, the rust had not intensified on sugar pine since the original infection, which appears to have occurred in 1937. Rust was located at the following places in this unit: two trees with two cankers, and two lightly infected R. sanguineum bushes were located in Salt Gulch. One sugar pine with one sporulating canker and

four lightly infected Ribes lobbi bushes were found at the end of the miners' road on Horse Creek. Another small sugar pine, which had been killed during the summer by a sporulating trunk canker, was found at the confluence of the East and West Forks of Horse Creek. Although several bushes of R. cruentum were nearby, none was diseased. The largest infection center in this unit was situated by the side of the Middle Creek road. There were nine infected pines (one small tree had died in 1942) with 26 cankers and one infected R. lobbi bush located at that area. The entire R. bracteosum belt on Middle Creek was examined with negative results; however, two cankers, one of which had sporulated, were found on two sugar pine trees about 20 to 30 chains up stream from the nearest R. bracteosum.

Scouting on Buckhorn Creek revealed one sporulating canker on a sugar pine in the southern portion of section 26. Conditions favorable to the establishment of blister rust were generally poor along this stream. Of the few R. sanguineum found near the diseased pine, none was found to be infected.

Scouting for blister rust on Trapper Creek, Jaynes Canyon, West Fork of Beaver Creek and Doggett Creek in the Cinnabar Springs Control Unit failed to reveal the presence of rust except on the latter stream. An infected sugar pine with one canker was located on one of the west branches of Doggett Creek in the southwest quarter of section 29. Another infection center of seven sugar pines with 52 cankers and several infected R. bracteosum was located on Doggett Creek just below the control unit boundary. These diseased trees were scattered along the stream for about a mile. Sugar pines were few along this R. bracteosum infested water course or there probably would have been a much heavier intensification of the disease. One sugar pine supported numerous incipient cankers. Generally speaking, this unit appears to be practically free of blister rust.

The rust at the beginning of the 1942 field season was probably more firmly entrenched on the Beaver Creek Control Unit than on any other unit in the Sugar Pine Region. Scouting on this area was performed almost continuously throughout the season by the Ribes eradication personnel which were later supplemented by the regular scouting crew. After considerable scouting along the many streams, it was found that the rust was confined to that portion of the unit lying east of Beaver Creek and south of the Oregon line. Even in this area of heaviest infection, it was surprising to find the rust almost entirely in small pockets. The distance between pockets varied from about 5 to 30 chains with few if any intermediate cankers.

Cankers were found on sugar pines growing along all the main drainages within the heavily infected portion of the control unit as well as in most of the side streams and draws. The Ribes had been removed from most of this area, but even where no eradication work had been done, infection on Ribes was still light and confined to the vicinity of sporulating cankers. Infected sugar pines were found along Bumblebee Creek, Paul Gulch, Chapman Gulch, Hungry Creek, Arastra Creek, Pond Gulch, Spaulding Creek, Monte Creek, Flystain Creek, both North and South Forks of Hungry Creek, and Beaver Creek. Most of the cankers found were of 1937 origin; however, a few were of 1940 and 1941 origin. Incipient cankers on sugar pine were found only at those sites which harbored conditions most favorable for rust development. It was found that wherever cankers of 1940 and 1941 origin appeared, they were far more numerous than were the cankers of 1937 origin. Also, the incipient cankers were confined to fewer trees (and these trees were limited to less area) than were those originating at the time of the initial infection.

Observations made at the various infection centers on the Klamath National Forest and on the forests of southern Oregon indicate that even though conditions for rust development on Ribes during the 1941 season were exceptionally good, conditions favoring the return of the rust to pine that fall were not comparable to those existing during the fall of 1937.

There were 922 infected sugar pines with 2,926 cankers located on the Beaver Creek area. Diseased pines were found in 15 of the 20 sections comprising this area. All trees examined were pruned and the cankers were removed at that time. The Beaver Creek Control Unit, under the present program, will have Ribes eradication work completed on it by the end of the 1943 season. At that time, the area should be comparatively safe from blister rust damage since both Ribes and cankers will have been removed. If the area is watched and reeradication work performed when needed, there is no apparent reason why the rust should ever build up again within its boundaries.

Observations made during the last few seasons verify the growing opinion that when blister rust is yet confined to the "pocket pattern" form of distribution on an area, it can still be controlled at little extra cost and with little pine damage by using a combination canker removal and Ribes eradication program.

Scouting on and Adjacent to the Lassen National Forest

The Hatchet, Montgomery, and Goat Creek infection centers were examined during mid-July by Hughes and Miller. Nine infected trees with one canker each were found on the South Fork of Montgomery Creek. Although three of the cankers had sporulated, only a few lightly infected Ribes were found. The areas around Taylor's Meadow, Terry Mill, and the meadow below Terry Mill (all of which had rust present in 1941) were examined but no rust was found. A small amount of Ribes eradication work on these areas would keep the rust under control until the nearby control units could be treated.

Scouting on Little Hatchet Creek revealed one canker on a sugar pine growing by the main stream, two more cankers on two trees growing along the east fork, and 24 cankers on 15 trees growing along the west fork. Infected Ribes at the latter centers helped locate the infected pines. While these centers are small now, there are numerous Ribes and sugar pines in the vicinity; and unless the area receives protection soon, each diseased spot could develop into a heavy rust area. This area is within the boundaries of a control unit.

An examination of the infection center on Hatchet Creek in the vicinity of Buckhorn Lodge disclosed a group of 7 infected sugar pines with 12 cankers that had been overlooked in 1941. Here again infection on Ribes helped to locate the diseased pines.

One infected pine with one sporulating canker was found at the Goat Creek center by first finding the rust on nearby Ribes. In no instance at any of these centers were the infected Ribes more than 3 chains from the sporulating cankers, and in some cases they were confined to a radius of one chain. This limitation in distance of the dispersal of the aeciospores demonstrated that no long-distance spread of the rust had occurred from spores produced at northern sources.

Since most of these centers lie within a control unit and since this is the one known rust area that has not had the Ribes removed, it should be given first priority on the 1943 Ribes eradication program. This general area, unless watched, could develop into a spore-producing center that might bring about premature infection of the sugar pine stands lying farther south.

An examination of the infection center along Bailey Creek in the vicinity of Viola resulted in the location of 24 infected sugar pines which had 32 cankers. Since the Ribes had been removed from most of this area earlier in the season, diseased bushes were limited to the one center that was examined before eradication work had been performed. These bushes were in the vicinity of an infected pine. This area should be free from blister rust damage for several years since both the blister rust cankers and the Ribes bushes were removed during 1942.

One infected sugar pine with three sporulating cankers was located by Benton Howard and Eugene H. Kincaid at Nulls Meadow which lies about three miles northwest of Viola. Ribes and sugar pines were few in number along the edge of the meadow. The Ribes were removed from this area during the summer of 1942.

Blister rust was found on Ribes during the fall of 1938 on Clear Creek which is located in the southwestern portion of the forest. The area was examined again this year and one infected sugar pine with one nonsporulating canker was discovered. Although this area is not in a control unit, it should be watched as it is an excellent site for the incidence and development of the rust. The spot where the diseased pine was located has an elevation of about 3,800 feet, which is toward the lower limit of the altitudinal range of rust infection developing from spores dispersed in 1938. So far, practically all blister rust infections of 1938 origin in the Sierras have occurred within a comparatively narrow altitudinal belt which ranges from 3,750 to 4,250 feet in elevation. Blister rust centers located near either the upper or lower limits were usually of light intensity. Observations made during the last two seasons indicate that ascospores during the spring of 1938 were quite generally distributed throughout the sugar pine stands on the Lassen and Plumas National Forests. Ribes infections and the resultant pine infections, however, were confined only to those few spots lying between the elevations of 3,750 and 4,250 feet which had all conditions necessary for rust development synchronized at the time the spores were being disseminated.

Blister rust on Ribes had been found in 1938 on Cement, Cascade, and Chico Creeks all lying in or adjacent to the Soda Springs camp area. These as well as several other likely blister rust sites were examined during 1942, but no further infection was discovered.

Scouting on the Plumas National Forest

Organized scouting on the Plumas National Forest was limited to the area around Cascade. Three infected sugar pines each with one nonsporulating canker were located on Fall River in Section 25. This was the first time blister rust on pine had been found in Butte County. The Ribes were removed from this stream during 1942.

Other infection centers in this area were examined, and with the exception of one nonsporulating canker found by Howard at the Lost Creek area, no

cankers had been missed in 1941. Ribes bushes throughout the Cascade area were removed from all streams, roads, and other spots having conditions favorable to the incidence and development of the rust. As a result of these protective measures, there is little danger of a rust flareup on this area for several years.

Scouting Elsewhere

During the latter part of May, Benedict and Miller made a trip up the Coast to reexamine those infected Ribes located by Partington in December 1941. No infection was found on the Ribes menziesii bushes growing along the Navarro River in Mendocino County. The two Ribes bushes in southern Humboldt County were located and found to be still infected. The disease apparently had overwintered as at least three generations of rust were present. A careful examination of the old leaves (which were partially decomposed) lying on the ground beneath the bushes pointed to the improbability that the rust had overwintered on them. On the contrary, all the evidence supports the hypothesis that overwintering took place on the leaves that remained on the Ribes bushes. These bushes were growing in a sheltered spot only a few miles from the coast; and it was evident that the Ribes had continued to put out new leaves throughout the winter. Most of the leaves on one branch were heavily infected and the bush as a whole had about the same proportion of diseased leaves as the ordinary infected bush would have during the first part of August. The overwintering hypothesis is further strengthened by the fact that the uredial stage on Ribes was not located elsewhere previous to June 24. This infection consisted of one spot of uredia (about one fourth inch in diameter) on a leaf of R. sanguineum in the Bumblebee Creek drainage on the Klamath National Forest. The first leaves bearing young telia were found July 16 at Montgomery Creek on the Lassen National Forest. There are no known white pine in the vicinity of the infected Ribes growing in southern Humboldt County.

Blister rust on R. divaricatum was discovered on Brush Creek which lies in the southern portion of Mendocino County. This find was made by C. W. Partington August 19, 1942. The nearest known sugar pines are about 5 miles east of this center. This is the southernmost infection (210 miles south of the Oregon line) that has been definitely identified as blister rust. There were 27 other bushes located in southern Mendocino County most of which were R. californicum which were infected with a Cronartium, but as no telia were present the rust could not be identified. These specimens of rust had the appearance of pinyon rust in southern California where Cronartium occidentale seems to have overwintered on Ribes for such a long period that telia are seldom, if ever, produced. Although a few of the Ribes harboring the unidentified Cronartium were in favorable association with sugar pine, a diligent search failed to reveal any cankers. There are strong possibilities that the rust at Brush Creek also overwintered on Ribes.

Some scouting for blister rust was done on the Eldorado, Stanislaus, and Sierra National Forests and on the Yosemite National Park by members of the Ribes eradication personnel. One pinyon rust infection (the only one for the state) was found on Ribes on the Stanislaus National Forest. No blister rust was located at any of these areas.

Pinyon rust infections on Ribes in previous years have been quite common throughout the Sierras, for example; 196 infected bushes were located during

1941. The scarcity of pinyon rust on Ribes in 1942 strengthens the conclusion that conditions existing in the Sierras during the spring of 1942 were not favorable for the dissemination of aeciospores or for the development of blister rust on Ribes.

SUMMARY

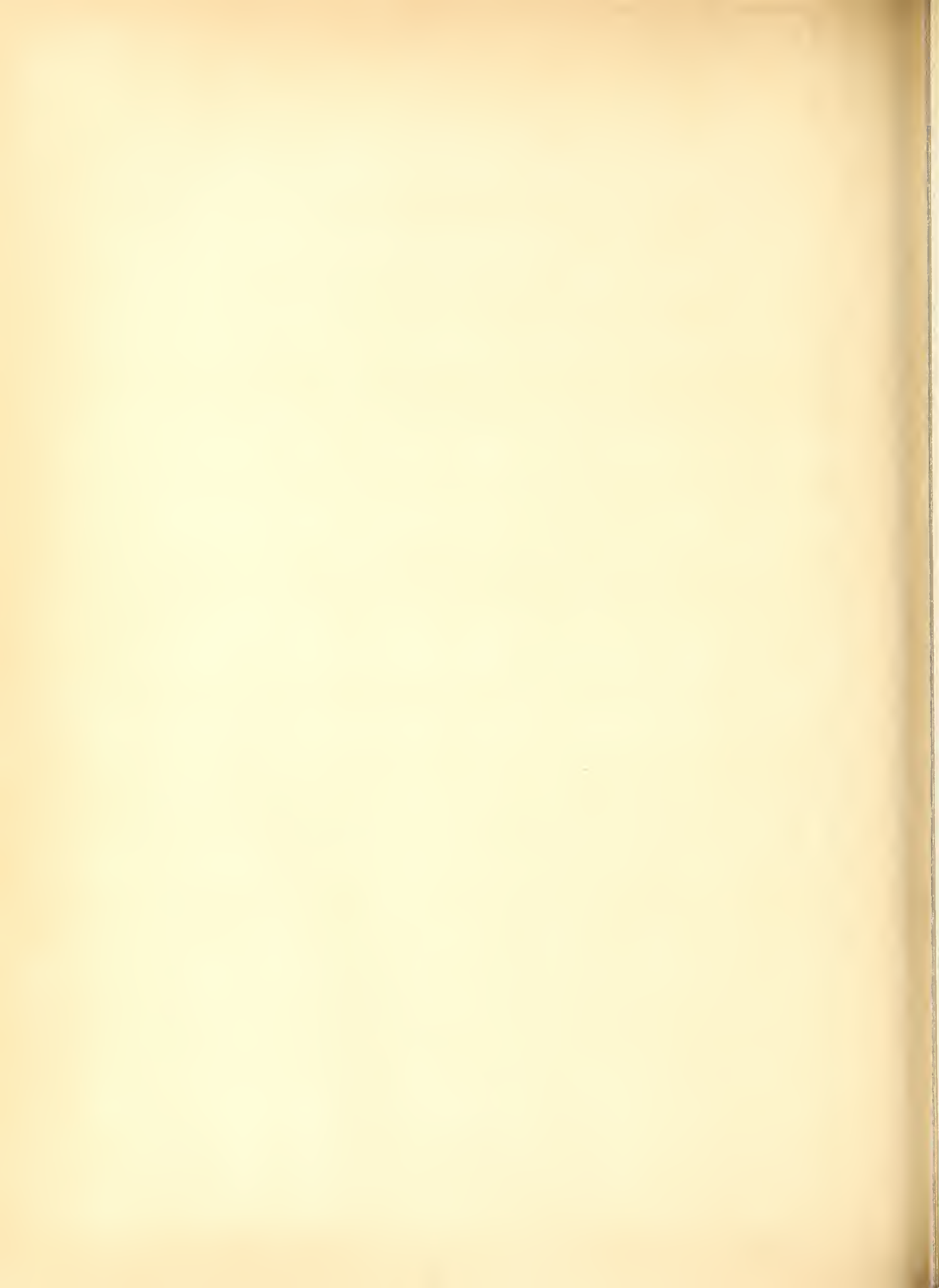
Scouting during 1942 revealed several new blister rust infection centers. Many important observations on the rust's behavior were made. A resumé of the results of the scouting season follows:

1. There was no general long-distance spread of the rust in California from aeciospores produced at northern sources.
2. Conditions favorable to blister rust development on Ribes were almost non-existent even in the vicinity of sporulating cankers.
3. This season was not favorable to the spread and development of pinyon rust as only one infected Ribes bush was found.
4. Evidence indicated that blister rust had overwintered on Ribes at one area near the coast in southern Humboldt County, California.
5. Infected Ribes bracteosum continued to cause more cankers on pines and to spread the disease a greater distance than did any other Ribes species.
6. It was observed that at those infection centers where cankers of 1940 and 1941 origin appeared, they were far more numerous than were the cankers of 1937 origin. Also the incipient cankers were limited to fewer trees (and these trees were confined to less area) than were those originating at the time of the initial infection.
7. At one location on the Rogue River National Forest, it was found that of six Ribes species present, including such highly susceptible species as R. bracteosum and R. cruentum, the bushes of R. triste were the most heavily infected. This was true not only for the per cent of bushes involved but also for the per cent of infected leaf surface per bush.
8. Scouting on the Lassen and Plumas National Forests of California strengthened the opinion that conditions favoring Ribes infection during the period of aeciospore dissemination in 1938 occurred almost exclusively within a 500-foot altitudinal belt. This belt began at 3,750 feet and ceased 4,250 feet in elevation.
9. Blister rust cankers at nearly all of the known or newly discovered infection centers were eliminated. A total of 20,903 cankers were removed from 2,675 pines.
10. Conditions conducive to blister rust development on Ribes during 1941 were the most favorable ever experienced in the

Sugar Pine Region. As a result, the amounts of infection and intensification of the rust on Ribes were far beyond any previously recorded. These factors did not hold true for the return of the rust to pine and were not nearly comparable in favorableness to those existing during the fall of 1937.

11. An infection of Cronartium ribicola, which had occurred under natural conditions, was found for the first time on Ribes erythrocarpum.
12. The blister rust infection zone in the Coast Range was extended about ten miles farther south when the disease was discovered on Ribes at the Brush Creek area.

The following table is a record of the blister rust infections found in Oregon and California during 1942. The pertinent data and information for each infection center examined are given in this table.



RECORD OF BLISTER RUST INFECTIONS FOUND IN OREGON DURING 1942

National Forest and Locality	S	T	R	H O S T			Inspectors	Date	Remarks
				Exam-ined	Infect.	Pine Cankers			
Umpqua National Forest									Infection from sugar pines located from 1/2 to 3/4 mile up Dumont Creek from road. Pines and Ribes generally scarce. Some of the cankers had sporulated in 1942 and as a result some infection on Ribes was found in vicinity of the fruiting cankers.
Dumont Creek	22	29S	1W				Youngblood Miller	9/25	
Rogue River National Forest									This infection center appears to be of 1937 origin with another wave of cankers in 1940 and 1941. Numerous Ribes bracteosum present. All trees under 14" DBH were removed to prevent further buildup of the rust. One infected R. erythrocarpum was found - the first time rust has ever been found on this species in its native environment.
Buck Creek	31 32 33 4	28S 29S	4E 4E	180 30 15	5 6 0	9			
Rogue River National Forest									
				700	190	1583			
				50 17 75 75 30 30	2 0 50 15 0 1		Hughes Winslow Offord Miller	8/12	
									Found an occasional infected white pine and Ribes up Rabbitears Creek within the control unit. When the control unit boundary was reached the infection increased many fold. R. bracteosum outside of worked area appears to be infecting white pine 15 or 20 chains inside of the unit. R. bracteosum should be removed for a distance of 1 mile outside of treated area.
Rabbitears Creek	35 36	29S	3E	350 13 47 35 27	17 2 1 17 5	30	Hughes Winslow Miller	8/19	
Rogue River National Forest									Two infected pines with one non-sporulating canker each located just above rock quarry. Quarry an excellent site for the incidence of rust. The area was worked in 1936 and the Ribes were removed again in 1942.
Rock Quarry	20	29S	4E	50 60	2 20	2	Winslow Hughes Miller	8/13	

RECORD OF BLISTER RUST INFECTIONS FOUND IN OREGON DURING 1942

County	National Forest and Locality	S	T	R	H O S T			Inspectors	Date	Remarks
					Examined	Infect.	Pine Cankers			
Douglas	Rogue River National Forest				Pinus lambert. 50 monticola 300 Ribes 30 lobbi 75 lacustre 30 bract. 175 binomin. 4 cruentum 100	1 3 1 2 0 4 0 0	1 3 - 2 - - -	Hughes Winslow Miller	8/17	Very little infection found along this stream. <u>Ribes bracteosum</u> is present toward the upper portion of the stream, but no infection was found on it. This area received initial treatment in 1934 and was reworked in 1937.
	Foster Creek	35 36	29S	3E	Pinus 300 monticola Ribes 10 lobbi 300 lacustre 50 bract. 100 binomin. 4 cruentum 20	18 1 10 40 30 2 20	27 - - - - - -	Hughes Winslow Miller	8/18	This area received its initial Ribes eradication in 1934 and was reworked in 1937. The light pine infection that is present is due to regeneration of Ribes along the stream, principally to <u>R. bracteosum</u> . Several infected pines were found at the boundary and just outside of the control unit caused by <u>R. bracteosum</u> left outside the worked area.
	Rogue River National Forest				Pinus 150 monticola Ribes 90	4 3	4 -	Hughes Winslow King Anderson Miller	8/26 9/25	This area received initial protection in 1936, but apparently a very light infection had occurred since that time, as four infected trees with one canker each (of 1937 origin) were found.
	Wizard Creek	32 33	29S	4E	Pinus 250 monticola Ribes 30 sanguin. 60 lobbi 48	15 0 0 15	30 - - -	Winslow Hughes Miller	8/20	Infection first found on this stream in 1935 but all cankers found were about 1/4 to 1/2 mile upstream from the original center and appear to be of 1936 or 1937 origin. <u>Ribes bracteosum</u> along stream. Area had Ribes removed in 1938. White pine along stream are rather scarce.
	Hard Luck Camp on Flat Creek	15	30S	3E						

RECORD OF BLISTER RUST INFECTIONS FOUND IN OREGON DURING 1942

County	National Forest and Locality	S	T	R	H O S T				Inspectors	Date	Remarks
					Exam-ined	Species	Infect.	Pine Cankers			
Multnomah	Rogue River National Forest				400 400	Pinus lambert. monticola Ribes sanguineum lobbi cruentum visco.	23 18	207 102	Wessela Winslow Hughes King Miller		Ribes sanguineum and R. cruentum were numerous before initial Ribes eradication which was performed in 1938. Infection appears to be of 1937 origin. Area received a second working in 1942.
	Stella Mountain	23	30S	3E	8 21 30 35		1 1 11 3			8/11	No incipient cankers found.
	Rogue River National Forest				575	Pinus monticola Ribes sanguineum lobbi binomin. visco.	3	3			Three infected trees were found over a course of about 1 1/2 miles. Most of the Ribes examined were at the head of Prairie Creek but no infection found there. Area where infection was found had Ribes removed once and part of the area has had two workings.
	Rogue River National Forest	12 13 6	30S 30S 30S	3E 4E	60 300 40 75		3 1 1 0		King Winslow	9/26	Only one tree found with one canker. Ribes plants were removed in 1935 and again in 1937. A few Ribes coming back in along the streams. There has been no rework since then.
	Copeland Creek	6	30S	4E	700 50 30	Pinus monticola Ribes lacustre bracteosum	1 0 1	1		9/25	Ribes almost absent since the area was worked in 1936 and 1937. Pines numerous.
	Rogue River National Forest				500	Pinus monticola	1	1	Winslow King	9/25	The infection (of 1937 origin) is heaviest along the road just above the old campsite. The area originally had numerous Ribes present. One large Ribes cruentum on the road (a seedling in 1939) was practically defoliated by the rust. This area received initial treatment in 1939.
	Bybee Creek	18	30S	4E							
	Rogue River National Forest				250 50 8 20 1	Pinus lambert. monticola Ribes lobbi lacustre cruentum	34 7 0 0 1	74 9 - - -	Wessela Benedict Offord Hughes Winslow Miller	8/26	
	McCall Creek	2	31S	2E							

RECORD OF BLISTER RUST INFECTIONS FOUND IN OREGON DURING 1942

County	National Forest and Locality	S	T	R	H O S T				Inspectors	Date	Remarks
					Exam-ined	Infect.	Pine Cankers	Species			
	Rogue River National Forest							Pinus lambert. monticola Ribes sanguin. lobbi	Wessela King Anderson Hughes Winslow Miller		Western white pine numerous along bottom of draw where <u>Ribes sanguineum</u> concentrated before Ribes were eradicated. Sugar pine farther up the slopes was not so heavily infected. Infection was of 1937 origin but a few trees had numerous incipient cankers present. The Ribes were removed from this area again in 1942.
	Buck Basin	15 16	31S 31S	2E	500 1000	140 299	376 1127			8/21	
	Rogue River National Forest				350	1	1	Pinus lambert. Ribes sanguin. klamath.	Anderson King Winslow	9/24	One infected sugar pine located across Red Blanket Creek from Getz Mill. This area had Ribes removed in 1934 and again in 1937. The streams should be worked again.
	Red Blanket Creek	14	32S	3E	6 15	0 0	- -				The Barr Creek burn was an excellent site for the incidence and development of the rust before Ribes were removed. Ribes are now scarce since area was worked in 1934 and again in 1937.
	Rogue River National Forest				550	3	3	Pinus lambert. Ribes sanguin. lobbi	King Anderson Winslow	9/24	
	Barr Creek Burn	27	32S	3E	1 10	0 0	- -				
	Rogue River				1350	17	42	Pinus lambert. Ribes sanguin. lobbi lacustre cruentum visco.			Most of the infected sugar pines were located just outside the control unit. Ribes here were numerous and sugar pine common. The Ribes inside control unit removed in 1934 and again in 1938.
	Middle Fork of the Rogue River	1 2 3	33S 33S 33S	3E	100 75 300 4 19	15 6 3 2 2	- - - - -		King Winslow	9/26	
	Rogue River National Forest				50	6	6	Pinus monticola Ribes sanguin. lobbi lacustre	Anderson King Winslow	9/24	This infection center is outside the control unit. White pine and Ribes scarce, with the exception of <u>R. lacustre</u> along the stream. Poor association in most places.
	Imnaha Guard Station	10 15	33S 33S	4E	60 75 150	10 2 3					

RECORD OF BLISTER RUST INFECTIONS FOUND IN OREGON DURING 1942

County	National Forest and Locality	S	T	R	H O S T				Inspectors	Date	Remarks
					Species	Exam-ined	Infect.	Pine Cankers			
	Rogue River National Forest				Pinus lambert. Ribes sanguin. lobbi	35	18	212			Infection in a 20-year old burn. Ribes numerous but sugar pines are common to scarce. Original infection occurred in 1927 but most cankers are of 1941 origin. This area is outside of present control boundaries.
	Fredenburg Lookout Road	25 26	34S	2E		45 30	24 1	- -	Youngblood Miller	9/24	
	Rogue River National Forest				Pinus lambert. Ribes sanguin. lobbi	90	5	10			Infection confined to stream bottom as that is only place Ribes grow. Pines numerous in places, scarce in others. Area would be easy to protect. Outside present control boundaries.
	Vine Maple Creek	4 5	34S	3E		33 12	7 0	- -	Youngblood Miller	9/24	
	Rogue River National Forest				Pinus lambert. Ribes sanguin. lobbi	1000	0	0			Four infected Ribes lobbi were located at edge of small openings near the summit of Little Chinquapin Mt. Ribes not too common with the exception of two burns. This area is within a control unit but hasn't received initial treatment yet.
	Little Chinquapin Mountain	20	39S	4E		15 300	0 4	- -	Winslow Hughes Miller	8/29	
	Rogue River National Forest				Pinus lambert. Ribes sanguin. lobbi	60	9	37			Ribes rare except along draw and even then they are only occasional. Sugar pine common in most places. Association good along draw only. This area is outside of the control unit.
	Tub Springs Klamath	2	40S	3E		15 20	10 6	- -	Hughes Winslow Miller	8/27	
	National Forest Cottonwood Creek				Pinus lambert. Ribes sanguin. lobbi	115	2	3			Found two sugar pines infected at the old BRC campsite. Infection appears to be of 1937 origin. The area had the Ribes removed initially in 1939.
	BRC Campsite	32	40S	1E		20 10	0 0	- -	Winslow Miller Hughes	9/3	

RECORD OF BLISTER RUST INFECTIONS FOUND IN OREGON DURING 1942

County	National Forest and Locality	S	T	R	H O S T				Inspectors	Date	Remarks
					Species	Exam-ined	Infect.	Pine Cankers			
COOS	Siuslaw National Forest				Pinus lambert. Ribes sanguin.	300	0	0			No native white pines in the locality. Inspected sugar pines in nursery. Located 2 infected <u>Ribes sanguineum</u> just outside of control boundary. There are many <u>R. bracteosum</u> bushes up Mast Creek, however, they are screened by a heavy timber canopy and no infection was found on them.
	McKinley Nursery	21	27S	11W	bract.	75 40	2 0	- -	Youngblood Miller	9/26	
	Siskiyou National Forest										This is a bad infection center. No Ribes in immediate vicinity of infected pines. The sugar pine, regardless of size, have cankers scattered throughout their crowns. Flags were noted 50 or more feet from the ground. Sporidia, apparently were borne from <u>Ribes bracteosum</u> in stream bottom to pines on hillside by fog
CLATSOP	Marial Road	27	32S	9W	Pinus lambert.	100	35	183	Wessela Anderson Youngblood Miller	9/27	No Ribes were found in the vicinity of these infected sugar pines. Apparently the sporidia came from <u>Ribes bracteosum</u> in the stream below.
	Siskiyou National Forest				Pinus lambert.	100	6	30	Shollen- berg Kelly	5/8	The rust is beginning to get a fair hold on the pine in places. It is still in local areas or "pockets" and can still be controlled by eliminating the cankers and then the Ribes.
	National Forest	1			Pinus lambert. Ribes glutin.	75 6	18 1	53 -	Youngblood Wessela Anderson Miller	9/27	One center of 3 infected sugar pines located along trail, however, there must be more as Ribes infection was quite common for about 1/2 mile. Ribes and pines numerous. This area is now in the control unit.
CLATSOP	Reuben Mountain	13	33S	8W	cruentum	18	2	-			
	Siskiyou National Forest				Pinus lambert. Ribes sanguin.	150	3	3			
	Bolan Lake Trail	24	40S.	7W	lobbi	90 74	21 5	- -	Youngblood Miller	9/30	

RECORD OF BLISTER RUST INFECTIONS FOUND IN OREGON DURING 1942

County	National Forest and Locality	S	T	R	H O S T				Inspectors	Date	Remarks
					Species	Exam-ined	Infect.	Pine Cankers			
JOHNSON	Siskiyou National Forest				Pinus lambert. Ribes glutin. cruentum	75 35 12	30 15 4	103	Youngblood Miller	9/27	Ribes absent in the heaviest portion of the infection center. Cankers throughout crown indicating a long spread from Ribes to pine. <u>Ribes bracteosum</u> in stream below. <u>Ribes sanguineum</u> and <u>R. cruentum</u> located from 5 to 10 chains SE of center. No incipient cankers noted. Sugar pine abundant.
	Dutch Henry Trail	5	33S	SW	Pinus lambert. Ribes glutin. lobbi cruentum	85 60 90 15	12 9 0 1	35	Youngblood Anderson Miller	9/29	The infected sugar pines are in small opening in Sec. 22. Sugar pines common to scarce. Ribes numerous. This area lies within the control unit and received partial treatment in 1942. No incipient cankers found. Cankers appear to be of 1937 origin.
	Siskiyou National Forest	21 22			Pinus lambert. Ribes glutin. lobbi cruentum	15					
	Peavine Trail	23	34S	SW	Pinus lambert. monticola albicaul. Ribes lacustre binomin. erythro. visco. cereum inerme	15 40 150 75 50 1000 75 30 60	0 0 0 0 0 0 0 2	0 0 0 - - - - - -	Benedict Offord Wessela Winslow Hughes Miller	8/14	No rust was found around the rim of the crater on either Ribes or white pines. Two Ribes inerme lightly infected were located in the south end of the "panhandle" on Annie Creek. Numerous infected Ribes and some infected white pines were located at this point in 1941. The removal of all found cankers in 1941 apparently held the rust in check during 1942.
	Crater Lake				Pinus lambert. monticola albicaul. Ribes lacustre binomin. erythro. visco. cereum inerme	15 40 150 75 50 1000 75 30 60	0 0 0 0 0 0 0 2	0 0 0 - - - - - -	Benedict Offord Wessela Winslow Hughes Miller	8/14	No rust was found around the rim of the crater on either Ribes or white pines. Two Ribes inerme lightly infected were located in the south end of the "panhandle" on Annie Creek. Numerous infected Ribes and some infected white pines were located at this point in 1941. The removal of all found cankers in 1941 apparently held the rust in check during 1942.
KLAMATH	Annie Creek	25	32S	6E	Pinus lambert. monticola albicaul. Ribes lacustre binomin. erythro. visco. cereum inerme	15 40 150 75 50 1000 75 30 60	0 0 0 0 0 0 0 2	0 0 0 - - - - - -	Benedict Offord Wessela Winslow Hughes Miller	8/14	No rust was found around the rim of the crater on either Ribes or white pines. Two Ribes inerme lightly infected were located in the south end of the "panhandle" on Annie Creek. Numerous infected Ribes and some infected white pines were located at this point in 1941. The removal of all found cankers in 1941 apparently held the rust in check during 1942.

RECORD OF BLISTER RUST INFECTIONS FOUND IN CALIFORNIA DURING 1942

County	National Forest and Locality	S	T	R	H O S T			Inspectors	Date	Remarks	
					Species	Exam-ined	Infect.				Pine Cankers
Klamath	National Forest				Pinus lambert. Ribes sanguin. lobbi lacustre	2190	194	714	Hughes Slater Winslow Anderson Sovulewski Miller	9/11 9/14 9/17 10/2	Infection found mostly in small draws on north facing slopes of the Spaulding Creek drainage. Some incipient cankers present.
	Spaulding Creek Drainage	19 30 24	48N 48N 48N	7W 8W		347 115 30	13 3 0	- - -			
	National Forest				Pinus lambert. Ribes sanguin. lobbi lacustre	990	17	25			Infection light in this area. A good job of Ribes eradication was performed in 1941. All but one of the 25 cankers had produced aeciospores in 1942.
	North Fork of Hungry Creek	14 23 26	48N 48N 48N	8W		6 12	0 0	- -	Hughes Slater	9/3-9/9	Infection (of 1937 origin) heavy in spots and scattered all along Paul Gulch. Infected sugar pines heaviest around Sterling Mine. No incipient cankers present. Initial Ribes eradication in 1941.
	National Forest				Pinus lambert. Ribes sanguin. lobbi lacustre	1410	138	333	Anderson Sovulewski Zink Winslow Slater Wessela Miller		
	Pond Gulch and Sterling Mine	26 35	48N 48N	8W		60 60 15	30 4 0	- - -			
	National Forest				Pinus lambert. Ribes sanguin. lobbi lacustre	1400	36	94	Winslow Slater Anderson Sovulewski	9/18 9/28 -29	Infection (of 1937 origin) scattered all along the South Fork of Hungry Creek. Very few incipient cankers present. Initial Ribes eradication performed late in 1941 and 1942.
	South Fork of Hungry Creek	25 36	48N 48N	8W		36 19	7 1		Winslow Hughes Slater Anderson Sovulewski Miller		Infection (of 1937 origin) on sugar pine more or less continuous from the head of Chapman Gulch to the mouth of the North Fork of Hungry Creek. A few trees supported incipient cankers. The infection (of 1937 origin) located on this stream is very light as only 9 diseased trees were found. No incipient cankers present. This area received initial Ribes eradication in 1941.
	National Forest				Pinus lambert. Ribes sanguin. lobbi lacustre	2375	203	769			
	Chapman Gulch and Hungry Creek	30 31 25 26	48N 48N 48N 48N	7W 8W		60 80 15	13 3 0	- - -			
Klamath	National Forest				Pinus lambert. Ribes sanguin. lobbi lacustre						
National Forest					Pinus lambert. Ribes sanguin. lobbi lacustre						
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National Forest					Pinus lambert. Ribes sanguin. lobbi lacustre			</			

RECORD OF BLISTER RUST INFECTIONS FOUND IN CALIFORNIA DURING 1942

National Forest and Locality	S	T	R	H O S T			Inspectors	Date	Remarks
				Exam-ined	Infect.	Pine Cankers			
Klamath National Forest	2			2500	317	957			There were some heavy pockets of rust in places which contained cankers of 1940 and 1941 origin as well as those of the initial infection in 1937. Sections 3 and 4 had the Ribes removed in 1942. Section 2 has not been treated yet.
Bumblebee Creek	3			300	60	-	Hughes	9/1-	
	4	47N	8W	100	10	-	Winslow	4	
				30	0	-	Miller		
Klamath National Forest							Anderson		Fly Stain Creek was completely scouted and only 3 infected trees were found. Monte Creek had little work done on it but 5 infected sugar pines were located. Ribes removed in 1942.
							Sovulewski		
Fly Stain and Monte Creeks	22	48N	8W	550	8	10	Ellis	10/6	
Klamath National Forest				5	8	7	Howard		This area is just outside of the present control boundary. Ribes and sugar pines few. Infection on pine caused by Ribes lobbi. Infection of 1937 origin. Infection (of 1937 origin) was found on sugar pines at two points on Doggett Creek in Section 34. Numerous Ribes bracteosum present along the stream, but pines scarce. One infected sugar pine was located on the West Fork of Doggett Creek in Section 29. Ribes and pines common here.
Beaver Creek	29	48N	8W	6	0	-	Zink	10/23	
Klamath National Forest				344	8	52	Anderson		Scouting generally poor in this area as both Ribes and sugar pines are scarce. One infected pine located in Sec. 26 in a small opening. A few Ribes sanguineum were present in the opening. A few incipient cankers found.
				800	0	-	Miller		
				450	0	-	Howard		
				190	40	-	Ellis		
Doggett Creek	29			14	0	-	Sovulewski	10/7	
Klamath National Forest	34	47N	9W				Anderson		
				149	1	1	Miller		
				20	0	-			
				66	0	-			
				50	0	-	Anderson		
				9	0	-	Howard		
				4	0	-	Sovulewski		
Buckhorn Creek	26	47N	10W	5	0	-	Ellis	10/9	

RECORD OF BLISTER RUST INFECTIONS FOUND IN CALIFORNIA DURING 1942

County	National Forest and Locality	S	T	R	H O S T			Inspectors	Date	Remarks	
					Species	Exam-ined	Infect.				Pine Cankers
Douglas	Klamath National Forest				Pinus lambert. Ribes sanguin. lobbi lacustre bract. cruentum bignoni.	350 15 50 10 250 10 5	11 0 1 0 0 0 0	28 - - - - - -	Ellis Zink Sovulewski Anderson Howard Miller		One infection center was located by the road about 1 1/2 miles above Morgan's Ranch. Ribes lobbi and sugar pines are common along the road. Another center of two trees was found on Middle Creek in Section 21. R. sanguineum and R. lobbi present. Ribes bracteosum appears on stream about 1/4 to 1/2 mile below infected trees. Cankers of 1937 origin.
	Middle Creek and Middle Creek Road	20	47N	10W						10/13	
	Klamath National Forest				Pinus lambert. Ribes sanguin. lobbi lacustre visco. cruentum Klamath.	150 52 40 30 1 75 11	2 0 4 0 0 0 0	2 - - - - - -	Parker Zink Sovulewski Anderson Howard Ellis Miller		Found two centers of infection on Horse Creek. Each had one sugar pine with one canker. Scouting generally poor as pines are scarce along the stream and Ribes are scarce off the stream.
	Horse Creek	24	47N	12W						10/8	
	Klamath National Forest				Pinus lambert. Ribes sanguin. lobbi cruentum Klamath.	400 15 30 15 6	2 2 0 0 0	2 - - - -	Ellis Zink Anderson Miller		Two infected Ribes sanguineum were found on Salt Gulch in NW 1/4 of Section 35. Two infected sugar pines were found by the trail below Brights Cabin. Both Ribes and pines are scarce. Poor association at most locations.
	Salt Gulch	35	47N	11W						10/8	
	Klamath National Forest				Pinus lambert. Ribes sanguin. lobbi	150 8 6	2 0 0	8 - -			Many peculiar appearing cankers were located here in 1941, two of which were identified as blister rust. Scouting this year revealed only two more infected trees. Sugar pines are numerous but Ribes are scarce.
	Walker Creek Road	24	46N	12W					Winslow Miller	9/15	

RECORD OF BLISTER RUST INFECTIONS FOUND IN CALIFORNIA DURING 1942

County	National Forest and Locality	S	T	R	H O S T				Inspectors	Date	Remarks
					Species	Exam-ined	Infect.	Pine Cankers			
Klamath National Forest	Dillon Mountain Road	1/5	8	13N 6E	Pinus lambert. Ribes cruentum	300	98	443	Fowler	5/9	This infection center was located in 1941 and removed early in the spring of 1942 before many, if any, of the asciospores had been liberated. No incipient cankers were found. This area is outside the control units.
		7				15	0	-	Miller		
Klamath National Forest	Slater Butte-Tenned Mt. Road	12	23	17N 7E	Pinus lambert. Ribes sanguin. cruentum	180	56	393	Fowler	5/5	This infection center lies along the road near the top of a ridge. Many incipient cankers (they appeared to be of 1941 origin) were located. A few infected trees were found down the Slater Butte-Indian Creek Road. This area is outside the present control units.
		24	17N			160	12	-	Anderson	10/10	
						70	2	-	Howard	10/26	
Klamath National Forest	Road up West Branch of Indian Creek	10	15	18N 6E	Pinus lambert. Ribes sanguin.	350	210	1446	Fowler	5/7	Since this infection (of 1937 origin) is outside the present control units most of the young sugar pines were removed during canker removal to prevent the rust from getting out of hand. No incipient cankers were observed.
						25	0	-	Miller		
Klamath National Forest	South Fork of Indian Creek	7	17N	7E	Pinus lambert. Ribes cruentum	320	160	602	Fowler	5/8	This infection center (of 1930 to 1933 origin) originally had two small sugar pines supporting cankers. These cankers sporulated and in 1937 another wave of cankers was started. During this wave 153 more trees were infected. Ribes cruentum common.
						60	0	-	Miller		

1/ Humboldt Meridian

RECORD OF BLISTER RUST INFECTIONS FOUND IN CALIFORNIA DURING 1942

County	National Forest and Locality	S	T	R	H O S T			Inspectors	Date	Remarks
					Exam-ined	Infect.	Pine Cankers			
SIKSIYOU	Klamath National Forest				300	214	10,596			Infection on sugar pine (of 1929-30 origin) was discovered on this creek in 1936. Two trees were involved in 1930 while incipient cankers were found on six more in 1936. Cankers were removed from 214 trees in 1942. This area is outside of the control units.
	East Fork of Indian Creek	16			18	1	-			
		21			30	0	-			
		28	18N	7E	15	0	-	Anderson Miller	10/24-25	
HUMBOLDT	West Trinity National Forest				30	15	-			Relocated and examined the Ribes bushes which C.N. Partington had found to be infected with blister rust in December 1941. They were still infected and some leaves showed real old telia (had turned black), newer telia (straw colored), and fresh uredia which indicates that the rust had overwintered on the leaves of Ribes.
	On Highway 101 4.12 miles N. of Humboldt-Mendocino County Line	12	5S	3T	50	2	-	Benedict Miller	5/28	
MENDOCINO	West of Mendocino									
	National Forest On Manches-Boonville Road									An infection on Ribes divaricatum was identified as blister rust. This extends the known southern outpost to about 210 miles south of the Oregon line. The nearest sugar pines are about 5 miles east of this location.
	2.3 miles east of State Highway No. 1 Lassen	2/29	13N 16W		25	1	-	Partington	8/9	
SHASTA	National Forest				500	18	27			Ribes and sugar pines numerous. The area is within the boundaries of a control unit but hasn't received control treatment. The infection is of 1938 origin.
	Little Hatchet Creek	13/24	35N	1E	340/48	20/1	-	Hughes Miller	7/17	

RECORD OF BLISTER RUST INFECTIONS FOUND IN CALIFORNIA DURING 1942

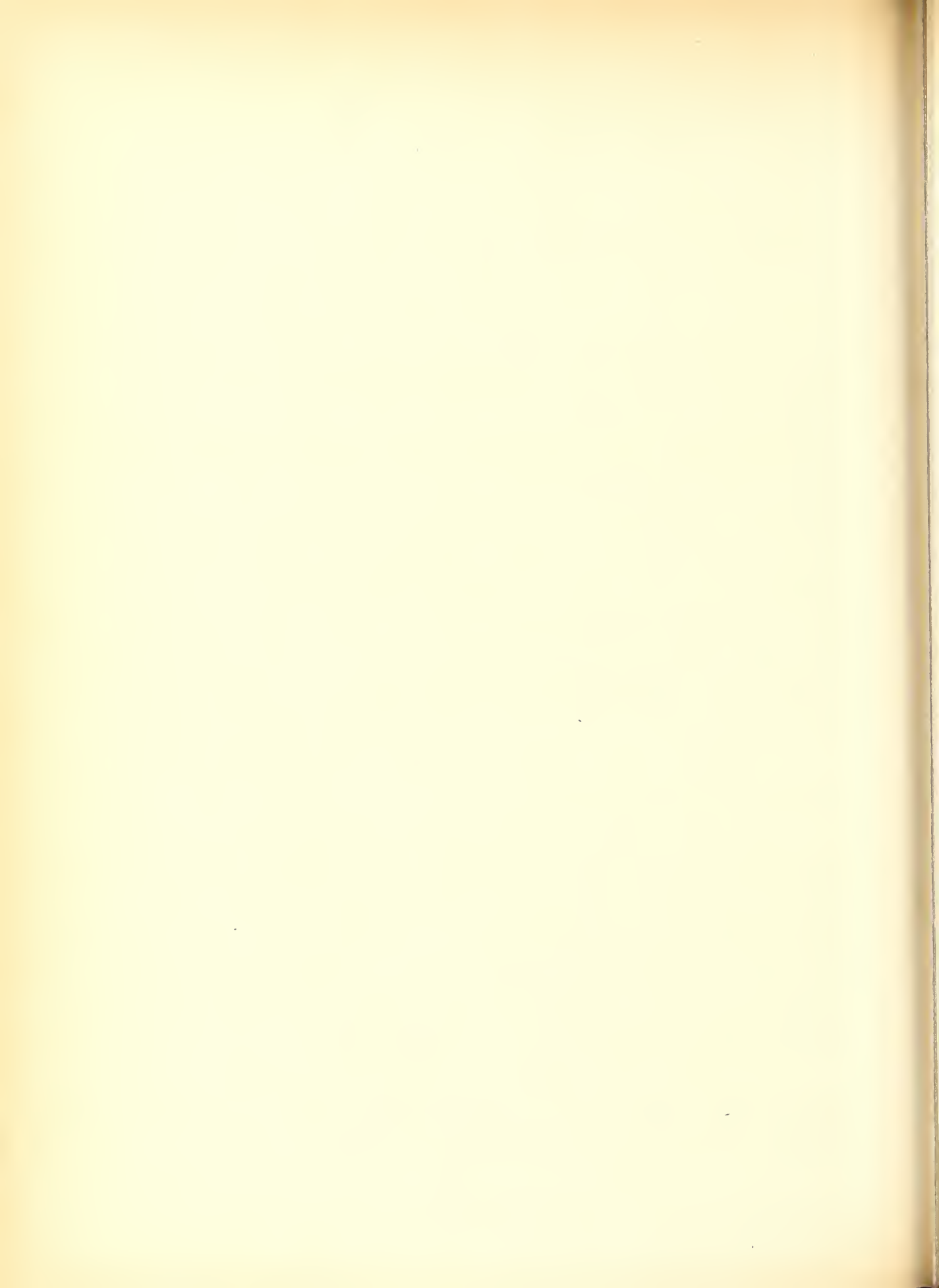
National Forest and Locality	S	T	R	H O S T				Inspectors	Date	Remarks
				Exam-ined	Infect.	Pine Cankers	Species			
Lassen National Forest Hatchet Creek near	26	35N	1E	Pinus lambert. Ribes roezli neva.	125 100 12	7 15 0	12 - -	Hughes Miller	7/18	Ribes and sugar pines numerous. Infection (of 1938 origin) is about 12 chains northwest of the one located on Hatchet Creek last year.
Lassen National Forest				Pinus lambert. Ribes roezli	100	1	1	Hughes Miller	7/19	The infected pine and Ribes were at the center located in 1941. Infected Ribes were within a chain of the sporulating canker.
Goat Creek	35	35N	1E	Pinus lambert. Ribes roezli	75	5	-	Hughes Miller	7/19	Examined the centers around Taylor's Meadow, Terry Mill and the South Fork of Montgomery Creek. The only infection found was at the latter center.
Lassen National Forest	15	34N	1E	Pinus lambert. Ribes roezli neva.	150 160 30	9 25 2	9 - -	Hughes Miller	7/16	One infected sugar pine located at edge of meadow. Pines and Ribes in immediate vicinity very few. Excellent exposure. Cankers of 1938 origin. Ribes eradicated in 1942.
Dr. Null's Meadow	2	31N	2E	Pinus lambert. Ribes roezli neva. inerme	30 60 4 100	1 0 0 1	3 - - -	Kincaid Allen Harris Hughes Miller	6/24 7/14	Examined the Bailey Creek infection center where rust on Ribes was first located in 1938. Found 24 more infected sugar pines. The Ribes were removed from this area during the season of 1942.
Lassen National Forest	19 29			Pinus lambert. Ribes roezli neva. inerme	1,000 150 10 80	24 6 0 0	32 - - -	Hughes Miller	7/21	
Bailey Creek	30	31N	3E							

RECORD OF BLISTER RUST INFECTIONS FOUND IN CALIFORNIA DURING 1942

County	National Forest and Locality	S	T	R	H O S T				Inspectors	Date	Remarks
					Exam-ined	Infect.	Pine Cankers				
PLUMAS	Lassen National Forest				Pinus lambert. Ribes roezli neva.	291	1	1			One infected sugar pine with one non-sporulating canker was located at the edge of a small meadow where rust on Ribes was found in 1938. Ribes numerous and pines are common.
	Clear Creek	5	24N	4E		650 260	0 0	- -	Hughes Miller	7/26	
	Plumas National Forest				Pinus lambert. Ribes roezli neva.	175	3	3			Three sugar pines with one non-sporulating canker each were located on Fall River. The cankers appeared to be of 1938 origin. The Ribes were removed during the 1942 season.
	Fall River	25	21N	7E		150 175	0 0	- -	Hughes Miller	7/10	
PLUMAS	Plumas National Forest				Pinus lambert. Ribes roezli neva.	100	1	1	Howard Offord Winslow		One sugar pine supporting one non-sporulating canker was located at the Lost Creek infection center. The Ribes were removed from stream in fall of 1942.
	Lost Creek	28	21N	8E		1,000 100	0 0	- -			

PROGRESS MADE IN
RIBES ECOLOGY AND DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION
BY THE
BERKELEY OFFICE

Work Project BLR-1-6



PART VIII

PROGRESS OF RIBES ECOLOGY WORK AND DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION IN THE SUGAR PINE REGION FOR 1942

By

Clarence R. Quick, Associate Forest Ecologist, L. P. Winslow, Agent,
and H. R. Offord, Pathologist

FOREWORD

As a wartime economy, text and tables of the 1942 Annual Report on Ribes Ecology and Methods Development in the Sugar Pine Region have been abbreviated. No photographs have been used this year. In Section I, brief status summaries are given of the ecology and methods sub-projects, both field and laboratory, which have been under investigation during the calendar year of 1942. Because the results of a single year's work in Ribes ecology are most understandable if viewed against the background of previous related work, the ecology summaries appearing in Section I attempt to evaluate current work and also to correlate it with trends established by previous studies. In Section II details are presented of the several field studies in Ribes ecology now in progress. Current improvement work in methods of Ribes eradication is described in Section III. If the scope of a particular sub-project has been small it is reported only in the summary. The reader may thus secure a quick review of all 1942 work in methods and ecology merely by reading Section I. Because of losses in operations personnel to the armed forces, L. P. Winslow was called upon to help in camp construction, preeradication survey, training of specialized eradication crews, and in disease survey work. Reports on these activities, where necessary, are given in other parts of the regional report.

SECTION I. STATUS SUMMARIES OF ECOLOGY AND METHODS WORK

1. Ribes Ecology in the Sugar Pine Type.

Ribes regeneration on the Cow Creek 10-acre plot. The principal trends so far indicated by a study of data from this plot are: (1) the lack of increase since 1937 in the number of known Ribes bushes, (2) the near constancy of average size of bushes since 1934, and (3) the relative constancy of percentage of fruiting bushes for 1937 and 1942. The Ribes population on the Cow Creek 10-acre plot thus appears to be static. It is believed that the brush and coniferous reproduction on the area have sufficiently advanced the maturity of vegetation to prevent any additional establishment of Ribes seedlings, although the mature Ribes that are now present can be expected to persist for some time.

According to present plans the 2 sets of 10 selected subplots on the Cow Creek plot will be inspected annually. The remaining 80 subplots will be inspected at 5-year intervals until eradication becomes necessary because of possible rust damage, or until the Ribes are crowded out by other vegetation.

Occurrence of current season seedlings on worked areas. This study relates to several sets of milacre plots in areas of high *Ribes* seedling regeneration. One new set of milacre plots was established in 1942 to compare the seedling occurrence of *R. nevadense* with that of *R. roezli* on an area favorable to the regeneration of both species. The remaining sets have been established for several years. There has been a wide variation in the number of seedlings on milacres within a single area and even within contiguous milacres of a single plot. In general the number of current season seedlings removed per milacre per year is rapidly declining. On the Cow Creek (Stanislaus N.F.) series, however, there has been a steady increase in current season seedlings removed for the past four seasons. This unexpected phenomenon will be subjected to thorough analysis. In five seasons one milacre on Chowchilla Mt. (Sierra N.F.) has produced a total of 6,289 *Ribes* seedlings.

Correlations between seedling occurrence and meteorological factors, and other ecological factors, should be attempted. Annual inspections should continue. The curve of decrease of current season seedling occurrence, and other trends, should shortly become more definite.

Seedling survival and growth on worked areas. The survival to date of current season seedlings and older seedlings on many worked areas has been encouragingly low. Growth in general has been slow. Survival and growth vary widely within small areas, and broad general averages are therefore somewhat misleading. Because of the length of time necessary to follow *Ribes* bushes through from occurrence as seedlings to maturity as fruiting bushes, available data of this type are still too few to do more than indicate trends. It now seems, however, that the average age of fruiting of seedlings is 4 to 6 years instead of 3 to 4 years as commonly supposed in the past. The data collected from these plots indicate the extreme difficulty of getting certain types of vegetation free of *Ribes*. The fruiting-bush problem on most worked areas is largely due to the small missed bushes of previous eradications, rather than to seedlings appearing subsequent to eradication. The general and sometimes considerable occurrence of fruiting bushes prior to re-eradication can generally be charged to development of missed bushes. In 1942 the check showed 34 fruiting bushes on one plot and one fruiting bush on each of 3 others. None of these plots was worked in 1942.

Ribes regeneration in grazing exclosures. Four sets of plots were established in the fall of 1940 to study the effects of grazing on the regeneration of *Ribes* and sugar pine. The period of study has not been long enough to provide more than an indication of regeneration trends, but it is apparent that the vegetation is growing and filling in more rapidly inside than outside the fences. This should eventually set up within the fences vegetational conditions which would tend to preclude *Ribes* seedling establishment. On the grazed portions of the plots the trampling of stock appears to have hindered the survival of *Ribes* seedlings as much as the continuing disturbance of grazing has favored their occurrence. The slow average rate of *Ribes* seedling growth both within and without the fences is encouraging.

Annual inspections of these several plots should continue until the effects of successional development of vegetation on the occurrence, survival, and growth of *Ribes* seedlings have been well defined.

Occurrence and growth of Ribes on burns. The plots of this series, concerned with the regeneration of Ribes on burns, have all been established on burns in timber or in other vegetation which was ecologically mature. On light burns where some of the vegetation such as Bear Clover (Chamaebatia foliolosa) resprouts from underground parts and where coniferous trees of appreciable size have not been killed, the control picture is encouraging. Heavy burns will cause more trouble unless eradication work can be promptly undertaken.

Conditions existing the first year after a burn not only produce by far the largest number of seedlings but also seem to produce the most vigorous plants. By comparison with these first year Ribes, higher mortality has been noticed for those Ribes which originated 2, 3, and 4 years after the burn. The total known number of Ribes of all ages also tapers off rather rapidly in the succeeding years subsequent to the burn and following reestablishment of vegetation. The almost complete lack of survival of those seedlings which appear a few years after a burn is very encouraging, and strongly indicates the desirability of working burns before Ribes fruit and to prevent fruiting of missed or newly established bushes.

These burn plots should be continued until the occurrence of new seedlings has stopped. If possible the series of plots should be augmented by the initiation of plots on burns representing forest conditions other than mature vegetation.

Regeneration of Ribes on one-acre plots. These 8 one-acre plots were established as samples of representative ecological conditions on which to follow the regeneration of Ribes populations subsequent to eradication by established crew methods.

These plots should be continued for a number of years. As the plots mature inspections could be made at longer intervals.

Fruiting of seedling-origin Ribes bushes. Seedling-origin bushes of R. roezli have in general been 4 to 5 years old at time of first fruit production. In comparison, vigorous resprouts from gooseberry bushes improperly eradicated early one season may fruit heavily the following season. The vigor of fruiting on the Cow Creek burn has been less than expected. Practically all currently surviving bushes on this area originated in 1937. No Ribes fruited prior to 1941, the fifth season of growth. Only 8 to 10 of the 377 staked seedling-origin Ribes bushes matured fruit in 1941. Only about two dozen of the 395 staked bushes matured fruits in 1942. The number of fruiting bushes produced by small areas of optimum Ribes regenerative capacity, by comparison, is very considerable. There has been removed from plot G, Chowchilla Mt. (Sierra N.F.), an area of 24 milacres, a total of 564 fruiting bushes in the five seasons (1938-42) of inspection. This means that some 4,700 fruiting bushes have been removed per acre per year.

Detailed studies on the fruiting habits of R. roezli on the Cow Creek burn, and on the Chowchilla plot should continue until fruiting habits are better understood. As other series of plots progress, e.g., the grazing exclosure plots, detailed data of fruiting habits might well be collected from them.

2. The Ribes Regeneration Key.

The development of a Ribes regeneration key was started in 1940. The seedling regeneration of R. roezli is ecologically a complicated matter, and considerable difficulty has been encountered in weighting and in organizing selected factors into a simple effective outline to indicate by inspection of an area and by a compilation of data already at hand the future seedling regeneration to be expected. Considerable progress has been made, and the key as now organized appears to be reasonably consistent and accurate. Perhaps because of the multiplicity of factors involved and the simple additive scheme now used in its organization, the key is not more than passably sensitive to slight changes in field conditions. Progress to date, however, is such that continued work on the key is desirable. The discussions incident to factor selection and factor weighting have in themselves, and to a considerable extent, clarified the forecasting of Ribes regeneration on specific areas. Development of the Ribes regeneration key should be continued until its scope and limitations can be definitely established.

3. Methods Development in Cooperation With Operations Work.

Rapid coverage of areas light in Ribes. At Soda Springs, Lassen National Forest, 930 acres were worked by the checker-flanker method and at Calaveras Big Trees, Stanislaus National Forest, 1,189 acres were covered in a similar test. Four flankers or crewmen worked with a checker who ran his regular type of 5 percent check strip. Post-check and eradication were thus carried out simultaneously. Data indicated: (1) Areas light in Ribes or logged areas originally light in Ribes can be covered rapidly by specialized scout crews of the checker-flanker type, (2) 14-16 acres per man-day can be covered by such fast methods, (3) the Ribes populations on such areas can be substantially reduced by this rapid, systematic coverage, (4) paper markers can be hung up at intervals to replace string laying, and (5) Ribes data, if taken by high caliber crews, can often be compared with post-check data to predict the outcome of the regular check.

Additional tests of scout crews on areas light in Ribes should be made. Three and 4-man crews working without a checker and with and without a compassman should be tried. Enough field data should be taken on these studies to allow a cost analysis by control standards. Analysis by control standards would require that control standard divisions as indicated by post-check would be delimited with string in the field and these lines used as work block boundaries.

Until we have bush counts and working time for blocks which have been worked to recognized standards of control, accurate comparisons between control standards cannot be made. Further, the population class data (control standards) are needed to determine the difference in cost when working comparable areas to an 8- or 16-ft. live stem standard.

Tractor work. The Caterpillar D-2 tractor was used to good advantage in the Cascade area, Plumas National Forest, California for spot working heavy patches of Ribes. The grapple hooks powered from the rear drum were used in most of the work. No new tools or appliances were introduced, the emphasis being placed on proper handling of the equipment for maximum production

and efficiency. (See 1939, 1940, and 1941 annual reports for details of the machine and how it is used.)

Eradication by burning. The Hauck pre-heating torch was used in regular eradication work along Butte Creek, Lassen National Forest, California. Crowns of R. nevadense and R. roezli growing in solid rock were given a 3-8 minute treatment. These bushes had been left by hand eradication crews as being impossible to remove with ordinary grubbing and pulling tools. A 3-man crew spent several days cleaning up bad spots with the torch. Small-scale plot tests of the Hauck torch which were made in 1941 were checked on June 11, 1942. Excellent results were secured from the treatments of rock-bound R. nevadense (South Fork of Feather River). Results were not satisfactory on R. roezli (Mooreville Ridge) rooted in rocky soil.

String dispensing devices. In order to concentrate attention of all crew members to the actual eradication of Ribes, supervisors try to minimize the time and attention of the stringmen to the job of laying string. Considerable interest has recently been shown in special devices or receptacles for holding and dispensing string. Several experimental models were constructed and taken to the field for trial. Perhaps the most ingenious and practical solution to the problem was contributed by a crew leader, Floyd T. Flodberg, on the Klamath National Forest, California. This device, known as a "Flodberg," is a 3-pronged stick consisting essentially of a main prong and two sturdy side prongs. The main prong is thrust through the hollow center of the string ball and the two remaining prongs are hooked under the worker's belt. The worker thus has both hands free for digging and pushing aside brush as he progresses along strip. A tree (usually dogwood or fir) is selected, having branches grouped so as to facilitate the pruning and fashioning of the holder just described. When the worker travels down hill the two belt-holding prongs are hooked under the belt from the bottom thus allowing the small end of the string-cone to point upward and outward for easy unspooling. For work uphill or on level ground the two prongs are hooked over the belt from the top. The "Flodberg" is easily removed when prolonged digging in one place is necessary.

4. Special Activities of the Methods Project.

Soils study. In company with Dr. G. B. Bodman of the Soils Department, University of California (recently appointed as collaborator with this Bureau), Offord and Winslow made a soils survey which embraced important parts of the sugar pine region of the Cascade and Sierra Nevada Mountains from Viola on the Lassen National Forest to Shaver Lake on the Sierra National Forest. Soils origins and soils formations were studied and samples were taken of 10 typical sugar pine soils for subsequent laboratory and greenhouse tests. Many other test holes were dug and notes were taken on pH of soil and on general physical properties of the soil profile.

As a part of the study program, rocks were collected at all the sampling locations, both from the sample holes and from the vicinity. These rock collections are of interest because most sugar-pine type soils are considered to be residual, i.e., soils are formed in place from parent underlying rock material. An extensive type of soil survey was made of the Cascade area, on the Plumas National Forest. These soils data will be correlated with Ribes data as eradication progresses on the unit. A full report will be made later on the significance of soil in relation to Ribes regeneration.

Toxicity tests of ammonium sulfamate. Aqueous solutions of ammonium sulfamate applied at the rate of 3, 5, 7, and 10 pounds of dry chemical per acre were applied to plots in the Camel Peak area, Plumas National Forest, California. Two sets of plots were established, one on July 9 and the other on September 8, to determine seasonal variations in Ribes susceptibility to the chemical. Ribes made up nearly complete ground cover on the plots which closely resemble the area shown in pictures 1-3, plate 1, page 118 of the 1941 annual report. Full data will be reported following a 1943 check of results.

Effectiveness of Diesel oil. The milacre oil plots at Boggy Meadows and Chowchilla Mt., Sierra National Forest, oil treated plots inside and outside grazing exclosures, and practical tests on the Plumas and Lassen National Forests were checked during the field season of 1942. Dosages of 5 gallons of Diesel oil (see 1940 annual report for Sugar Pine Region, pp. 105 and 106) killed 100 percent of the original Ribes population and apparently destroyed all duff-stored seed. Large intact Ribes can be killed by a dosage of 1 quart or more of oil per bush but layered branches are not killed merely by treating the central crown. Unless Ribes are well defined as individual bushes Diesel oil, or other oil mixtures, will probably not furnish a satisfactorily high bush kill for initial eradication work. The use of oil is strongly recommended, however, as a followup treatment one year after hand or machine work in areas of vigorous Ribes regeneration.

5. Laboratory and Greenhouse Work.

Laboratory and greenhouse studies relating to the improvement of control methods were in progress at Berkeley throughout the calendar year of 1942. Greenhouse facilities for our work are now provided at the Albany Gill Tract of the University of California. Early in November 1941 all equipment and plant material were moved from greenhouse No. 6 on the campus to the Gill Tract. These new quarters provide many improved facilities, though the present curtailment of auto travel makes the new greenhouse location more inconvenient than was anticipated. Also, continuous care of the greenhouse has had to be provided by the permanent Berkeley staff since January 1942 when cessation of the WPA project deprived us of a greenhouse assistant. The following summary gives the scope and objectives of the more important laboratory and greenhouse assignments for 1942.

Soils work. The development of the Ribes regeneration key in California and Idaho emphasized the need for more data on soils, especially in California, where considerable variations in soil types occur. Twenty-eight California soil samples collected in 1938 were tested for moisture equivalent (by high-speed centrifuge) and permanent wilting percentage (by standard sunflower test). Data for available water were calculated but these figures must be considered as approximations because the soil density was not measured in the field at the time the soil samples were taken. A smaller number of soils, representing in a broad way the range or variations in soil types with which we are commonly concerned, were analyzed for total nitrogen and organic carbon. The carbon-nitrogen ratio provides an approximation of what has been termed the "fertility level" of the soil. A new and potentially convenient technique for determining wilting point percentage was tested for several of the soils already checked by the sunflower method. The principle of the new method is to allow tared dishes containing the soil samples to come to equilibrium with a saturated solution of barium nitrate in a desiccator, the whole system being maintained at reasonably constant room temperature. The method

lends itself to testing of large numbers of soil samples and requires little or no attention once the samples have been set away. Further tests of California and Idaho soils are planned with this new method.

Correlations of the above physico-chemical soils data with germination tests and growth tests of *Ribes*, and with data on the *Ribes* populations and general site index previously obtained at the time of collecting the soil samples, showed that the soils having the lowest amount of available water and the lowest fertility level were the poorest *Ribes* sites.

Soils work will be continued during the winter of 1942-43 with the examination of samples collected in California during the 1942 survey. Useful soils data have been obtained in Idaho from the Kaniksu light-moisture plots. pH measurements have been made annually for the past 3 years on 27 soil samples from the Kaniksu plots. Top to root ratio and pictorial records of root development taken from these Kaniksu plots show differences occasioned by soil surface condition (i.e., mineral soil, burned mineral soil, and duff) in combination with insolation (i.e., full sun, half shade, full shade).

How to distinguish between diseased and normal pine bark. In response to a request from Washington, a study was made of reagents which could be used to identify diseased and normal bark. On freshly cut thin sections of pine twigs, or thin strips of bark and stem cambium, standard ferric chloride (tannin test) and iodine + potassium iodide (starch test) reagents were absorbed and showed their typical blue-black colorations much more rapidly in the diseased than in the normal bark. A combination of alphanaphthol and concentrated sulfuric acid actually showed a color differentiation between healthy and diseased tissue but this reagent is inconvenient for field use. On the surfaces of pine bark the presence of an incipient canker, or the margin between diseased and healthy bark, was clarified and intensified by a few drops of xylool. A small dropping bottle with a ground glass cork is a handy container for carrying xylool in the field. This reagent should be useful on plot work or strip surveys for checking on questionable incipients.

How to identify underground parts of *Ribes* capable of sprouting. Laboratory tests on *Ribes* garden material, later confirmed by extensive field tests, showed that stolons, buried stem, or layering stem may be readily distinguished from true roots by examining for pith and confirming its presence by examination under a hand lens or by the so-called "pin test." Under gentle pressure of a pin or a sharp knife-point, pith feels soft and spongy. A hard, woody center is typical of a root and the soft pith indicates a stem which, of course, is capable of sprouting. If the specimen contains stem tissue its central core will stain black or dark blue with ferric chloride or iodine-potassium iodide, the same reagents used for distinguishing between diseased and healthy pine bark.

Greenhouse tests on growth habits of *Ribes*. The effects of grazing animals and destructive rodents and insects on *Ribes* seedlings are important in the cycle of *Ribes* regeneration. To augment field data on this subject, a series of cutting tests were made on *Ribes* seedlings in germination flats and in transplant flats. Tests were made with *Ribes* seedlings at various stages in their development up to the time that the fourth leaf had developed. In some cases cotyledons were snipped off and in others the seedlings were cut below cotyledons or at a point which would remove cotyledons plus one or

more leaves. It is particularly interesting to note that *Ribes* seedlings have considerable vigor even at the cotyledon stage. Ten percent of those which were supposedly cut off "below cotyledons" survived and finally put out leaves. Thus some sprouting may occur following any cutting which fails to remove all potential growing points around the cotyledons. After the first two leaves had appeared, 50 percent of the seedlings in the germination flats survived decapitation at cotyledon level. Further tests are planned for the winter of 1942-43.

In California the inevitable association of *R. roezli* and *Ceanothus cordulatus* suggested the comparison under controlled greenhouse conditions of the growth rate and vigor of *R. roezli* with and without *C. cordulatus* in immediate association. Mr. Quick noticed that the *C. cordulatus* carried root nodules which were suspected to have the function of fixing nitrogen. Accordingly greenhouse tests were made which included a series of seedlings of *R. roezli* and *C. cordulatus* growing alone and in association. One group of cultures was inoculated with mashed root tubercles collected in the field from snowbrush plants; a group of controls was not inoculated. In general the aerial parts of *Ribes roezli* seedlings were appreciably larger and more vigorous when grown in association with seedlings of *C. cordulatus* (mixed culture) than when grown alone (pure culture). The reverse was true of snowbrush seedlings. In pure cultures, the tops of snowbrush seedlings were heavier than the tops of gooseberry seedlings. In pure culture both species favored natural forest soil over autoclaved forest soil. Top/root ratios for both species were higher in pure cultures than in mixed cultures. The top/root ratios of snowbrush were, in general, much higher than such ratios for gooseberry seedlings. The growth of snowbrush was not dependent upon inoculation by root-tubercle organisms, that is, snowbrush seedlings grew in autoclaved uninoculated soil. The detailed data remain to be analyzed and reported.

Experimental germination of *Ribes* seeds. In terms of man-hours expended, germination tests of *Ribes* seeds has been the most important greenhouse and laboratory assignment at Berkeley for the past 7 years. The 1942 report on seed germination tests (see Serial No. 114) described work on 26 *Ribes* species for which 1,017 cultures were prepared containing 69,755 seeds. Depth of planting and aeration were made the subjects of additional germination tests not yet summarized and further tests on the same topics are planned for the winter of 1942-43. The effects of depth of planting and aeration were noted several years ago in preliminary tests but are now being studied more intensively because of their relation to soil properties and to degree and type of soil disturbance by fire, logging, windthrow, erosion, and grazing. Forced aeration by continuous passage of moisture-laden air downward through the cultures did not help germination at a planting depth of 1 1/2 inches, but did indicate somewhat better results than watering with boiled and distilled water (lack of aeration) on shallow-planted cultures.

Preparation of reports. The following special reports were prepared in final or preliminary draft during 1942 and have been distributed:

Bureau MS No. 6552: "Self-Incompatibility in Several Species of Ribes in the Western States."

.....H. R. Offord, C. R. Quick, and
V. D. Moss

Serial No. 114:

"Experimental Germination of Ribes Seeds. Series of 1941."

.....Clarence R. Quick

Serial No. 115:

"Preliminary Report on the Use of Pregerminated Seed as a Method of Reforestation for Western White Pine."

.....Virgil D. Moss

Spokane Office Report:

"Ribes Eradication Methods Study for 1942:

1. St. Joe Operation
2. Clearwater Operation"

.....Virgil D. Moss with the collaboration
of personnel from St. Joe and Clearwater



SECTION II. FIELD WORK IN RIBES ECOLOGY FOR 1942

Serial Report No. 112 of the Berkeley Laboratory, "Manual for the Care of Ribes Ecology Plots in the Sugar Pine Region," dated October 8, 1941, describes the methods used and the studies and plots involved in the Ribes ecology program. Because of the lack of field assistants since 1941, few new plots have been initiated since the preparation of Serial Report 112. It has thus far been possible to continue all uncompleted studies.

1. Cow Creek 10-Acre Regeneration Plot.

(See pp. 85, 86, 91-94 of the 1941 annual report.) In 1941 all known Ribes were removed from 10 selected subplots of the Cow Creek 10-acre plot (CFES MC #5). These 10 subplots, one acre in total area, were carefully inspected in 1942. About 50 current season seedlings of R. roezli were found on subplot 6, on the sites of bushes removed in 1941. Also 10 older seedling-origin bushes of R. roezli (average age 4.5 years, average total live stem 1.3 feet) were found for the first time in 1942 on the 10 subplots. None of these bushes was fruiting.

A second group of 10 selected subplots (area one acre) were carefully inspected in 1941, but no Ribes were removed. In 1941, 106 Ribes were known on these plots. In 1942, one staked Ribes was found dead, and 4 previously unknown Ribes were located, so that in 1942 there was a known total of 109 live Ribes. The 4 newly found Ribes totaled 11.5 feet of live stem, and averaged about 3 feet of live stem. All of the newly found Ribes were 4 or more years old. Of the 109 known Ribes, 72 bushes (66%) were fruiting on June 25, 1942. The fruiting bushes averaged an estimated 115 fruits per bush. The total estimated Ribes live stem was 4,900 linear feet, an average of about 45 feet per plant, and about 215 feet in excess of the estimated total live stem in 1941. The average visual estimate of Ribes vigor was considerably higher in 1942 than in 1941.

The Cow Creek 10-acre plot consists of 100 tenth-acre subplots. Twenty of the subplots have been described above; the remaining 80 subplots were also checked in 1942. Table 1 summarizes some of the collected data.

2. Occurrence of Current-Season Seedlings on Worked Areas.

(See pp. 86 and 95 of the 1941 annual report.)

Table 2 reports the totals and averages of current season seedlings found to date on the 59 mileacre plots of the Stanislaus, Sierra, and Plumas National Forests on the plots of this series. The dates of inspection were added to the bottom portion of table 2 to explain some of the irregularities in the data. Unfortunately it was not feasible to check each series of plots on the same date of successive years. The data for the Cow Creek mileacre series obviously need no adjustment for date of check. The inspections of the Spanish Ranch Ridge mileacres have been very irregular. The other series are intermediate as to regularity of checking, but have been checked during the past several years at times that should cause no serious variations for current season seedling data.

3. Seedling Survival and Growth on Worked Areas.

(See pp. 86-87 and 96-100 of the 1941 annual report.) In addition to certain of the milacre seedling occurrence plots described under topic 2 above, there are several other small plots on which the survival of *Ribes* seedlings from current season seedlings to one-year-old plants can be computed. On some of the plots the year-old plants are removed, on other plots *Ribes* survival is followed through to first fruiting. Table 3 summarizes the seedling survival data for this group of plots.

Original descriptions of the plots in past annual reports will assist in the rationalization of these data. Percent survival of *Ribes* seedlings varies widely within small areas, and such variation can probably be attributed to biotic and microclimatic factors rather than to broad climatic or other factors affecting large areas.

4. Occurrence and Growth of *Ribes* on Burns.

(See pp. 87-89, 97-98, and 101 of 1941 annual report.) Table 4 presents data pertaining to the regeneration of *Ribes*, predominantly *R. roezli*, on burns in the vicinity of Cow Creek Guard Station, Stanislaus National Forest.

On the main portion of the burned area of the Cow Creek 5.6-acre plot (CFBS, MC #12) the *Ribes* seedlings were staked as they appeared upon inspection to be of such size, age and vigor as to be called "established," and were thereafter inspected at regular intervals for survival and rate of growth. The burned portion of MC #12 has an area of 1.5 to 2.0 acres. Horizontal line 3 of table 4 summarizes these staked *Ribes* seedlings.

Table 5 details the survival and growth data on the 395 live staked post-burn *Ribes* on MC #12. Except for 3 current season seedlings and the *Ribes* on the special milacre subplots, all known *Ribes* were staked in 1942. A number of interesting relationships are shown. For instance, notice that at the time of the 1942 inspection the average sizes of 1937-origin *Ribes* seedlings staked in the several years were as follows: 1937, 8.2 ft.; 1938, 3.4 ft.; 1939, 4.7 ft.; 1940, 3.3 ft.; 1941, 0.9 ft.; and 1942, 0.5 ft. Of a total of 422 bushes staked during the period 1937-1942, 395 were still alive at inspection in 1942. Notice also the skewness of the size distributions of the bush groups as they were staked, the displacement of distribution to the right, the spreading out, and the assumption of a much more normal type of curve as the years progress. The rate of growth of individual seedlings is seen to vary enormously.

Statistical analysis of these data will be made when the study is a few years older.

5. Regeneration of *Ribes* on One-Acre Plots.

(See pp. 89 and 102 of the 1941 annual report.)

The 8 plots of this series have been previously described in some detail and this year will be very briefly considered. Table 6 summarizes the *Ribes* data collected in 1942. None of the plots was eradicated in 1942. The Signal Peak plot had 34 fruiting bushes on it. The Pilot Peak, Gentle Gully,

and Rock Creek plots had one lightly fruiting bush each. Areas in the vicinity of several of these plots are very likely in need of additional work.

6. Ribes Regeneration in Grazing Enclosures.

(See pp. 89-90 and 103-104 of the 1941 annual report.)

Each set of enclosure plots consists of eight .025 acre (1/40 acre) subplots. Two grubbed subplots of each set are within the enclosure fence and 2 are outside the fence. Likewise 2 oil-treated subplots are within the fence and 2 are without. All 4 sets of enclosure plots were initiated in the fall of 1940.

Table 7 presents averages for *Ribes* regeneration data collected from the Cow Creek and Chowchilla enclosure plots. Because of lack of field assistants and inconvenience in travel, the Flumas enclosure plots were inspected only once during 1942.

7. Fruiting of Seedling-Origin *Ribes* Bushes.

(See pp. 90 and 104-106 of the 1941 annual report.)

A number of *R. roezli* bushes fruited for the first time in 1941 on the burned portion of the 5.6-acre Cow Creek plot (MC #12). Some *Ribes* fruited on this plot again in 1942, but neither as early nor as frequent inspections of the bushes could be made in 1942 as were made in 1941. The following is a summary of the 1942 data.

<u>Date of check</u>	<u>Fruiting bushes</u>	<u>Total fruits</u>
June 25	28	423
August 15	23	252
August 24	18	198
September 11	0	0

The fruits were ripe and the seeds were fully mature on August 24. The September inspection was made to see if any conclusions as to the fate of fruits and seeds could be reached. On this date few or no fruits were left on the ground beneath the bushes; practically all seeds apparently had been destroyed, presumably by rodents. All that remained of the fruits were husks of skin. These shells were in evidence under most of the *Ribes* plants which had fruited heavily. Apparently some of the fruits had been removed from the vicinity of the bush on which they were produced.

Table 8 summarizes the fruiting bushes which have been removed during the past several years from plot G, Chowchilla Mt., Sierra operation. Plot G has an area of 24 milacres and was initially eradicated of *Ribes* in 1935. There still remain on this plot many seedling-origin *Ribes* of assorted sizes and years of origin.

8. The *Ribes* Regeneration Key.

(See pp. 107-110 of the 1941 annual report.)

As outlined on page 110 of the 1941 report, the regeneration key left a number of things to be desired. The choice of included factors and their

organization has always been somewhat empirical, and so another revision of the key was made late in the summer of 1942. The major change was a general reduction in number of factors and the inclusion of a list of indicator plants, mainly herbaceous plants. Many of the factors remain essentially the same as in the key presented last year. The tentative lists of indicator plants follow (page references to Jensen's Manual are given in parentheses).

Indicators of recent disturbance, and of Ribes

Gayophytum diffusum (688). No common name.
Cirsium lanceolatum (1162). Bull thistle.
Phacelia heterophylla (819). No common name.
Bromus secalinus (79). Chess, cheat-grass.
Other annual and "weedy" grasses.
Herbaceous "woods" in general.
Nemophila spatulate (813). No common name.
Phacelia racemosa (822). No common name.
Euphorbia serpyllifolia (599). Thyme-leaf spurge.
Rumex acetosella (293). Sheep sorrel.

Indicators of moist soil, and of Ribes

Salix scouleriana (265). Nuttall Willow.
Rubus parviflorus (481). Thimble-berry.
Erilobium brevistylum (670). Also other annual weedy species.
Amelanchier alnifolia (509). Service berry.
Luzula campestris (208). Common wood rush.
Sambucus glauca (965). Blue Elderberry

Indicators of dense forest, but of no Ribes

Adenocaulon bicolor (1066). No common name.
Asarum hartwegi (283). Wild ginger.
Smilacina amplexicaulis (249). Fat Solomon.
Smilacina sessilifolia (249). Slim Solomon.
Disporum trachyandrum? (248). Fairy bells.
Clintonia uniflora (250). Bride's bonnet.

The recent draft of the regeneration key is outlined as follows:

Ribes Regeneration Key Outline of Revision of August 1942

A. Associated Plants (40 points).

1. Brush species - 20 (see previous lists). Use the dominants of the vegetation more than the occasional plants.
2. Timber species - 10 (see previous lists). Use dominants.
3. Indicator plants - 10 (see lists above). Arrive at composite figure for this factor based on presence or absence and abundance of indicator plants.

B. Other Vegetational Factors (40 points).

1. Maturity of vegetation - 20. *R. roezli* and its ecological requirements should be kept in mind when this factor is considered.

2. Vigor and density - 10. This is a combined rating for the visually estimated general vigor of the vegetation, and the density of the plant cover compared to the probable density at ecological maturity.

3. Ribes population - 10. Consider the age, size, and number of Ribes removed from the area by eradication, and the Ribes seedling regeneration.

C. Site Factors (40 points).

1. Topographic suitability - 20. This is mainly a matter of the effect of local and general topography on the movement of air (wind channels) up the slopes of the mountains. Include altitude considerations.

2. Exposure and slope - 20. The slope factor is mainly referable to depth and drainage of soil, the exposure factor to insolation and its effects.

D. Historical Factors (50 points).

1. Forest type and stocking - 20. To some extent include all vegetation. Try to read the history of past disturbances, and estimate the probable life span and intensity of past Ribes populations.

2. Past disturbance - 20. Correlate degree and age of recent or of last major disturbance.

3. Present disturbance - 10. Estimate the degree of continuous or continuing disturbances such as overgrazing, erosion, Ribes eradication, effects of rodent and bird populations, etc.

E. Edephic Factors (30 points).

1. Soil depth - 20. This factor stresses the depth of the soil as an indicator of the soil moisture reservoir, but includes also a consideration of soil aeration, friability, and general suitability of the soil for root growth and water conservation.

2. Soil drainage - 20. Assign a low figure for this factor if the drainage is either excessive or inadequate. Grade highest if the drainage is from above and through the area to the creek, giving well drained, but continually moist soil.

This last draft of the regeneration key has not been extensively tested. Insofar as it was tested, it appeared to be somewhat more satisfactory than previous drafts.

TABLE 1

RIBES DATA FROM 80 SUBPLOTS (8 ACRES) OF THE COW CREEK 10-ACRE PLOT

Items of Data		Dates of Inspection				
		June 1933	June 1934	June 1936	August 1937	August 1942
(ft.)						
Size distribution of	0 - 1.9	15	4	3	2	7
known live Ribes	2 - 2.9	21	16	16	19	12
bushes. In percentage	6 - 15.9	30	30	28	26	17
of total bushes.	16 - 40	23	21	29	28	31
	41 - 100	11	24	18	20	26
	101 - 500	-	4	6	5	7
Total known live Ribes		66	70	87	102	102
Died since previous check		-	-	1	2	5
Newly found bushes		-	4	18	17	5
Fruiting bushes (percent)		52	56	36	75	71
Non-fruited bushes (percent)		48	44	64	25	29
Average live stem per Ribes (ft.)		15.7	33.7	31.1	33.8	39.4

TABLE 2

CUMULATIVE DATA ON THE OCCURRENCE OF CURRENT SEASON SEEDLINGS ON MILACRE PLOTS

A. Cumulative Totals Including 1942

Mil-acre No.	Chowchilla Mt., Sierra N.F.				Cow Creek Campsite Stanislaus N.F.	Spanish Ranch Ridge Plumas NF
	1938 Milacres	1939 Milacres	Plot E	Plot F		
1	934	2,862	2,489	178	1,553	41
2	1,205	1,537	1,417	166	5,733	319
3	2,544	3,451	519	573	3,365	33
4	1,575	3,967	1,044	319	1,562	79
5	1,797	2,182	1,410	167	3,686	263
6	665	-	602	276	854	120
7	256	-	1,118	381	258	203
8	293	-	1,214	667	1,209	100
9	452	-	557	416	2,332	269
10	6,289	-	1,969	314	1,461	118
11	-	-	2,414	648	-	-
12	-	-	1,610	489	-	-
Averages	1,601	2,800	1,363	383	2,201	155

B. Group Milacre Averages By Years (With Dates of Inspection)

1942	7/6	104	7/6	150	7/9	42	7/9	21	6/19	159	8/2	4
1941	6/25	105	6/25	114	6/26	58	6/26	34	6/18	85	6/9	51
1940	6/10	233	6/10	481	6/10	107	6/10	59	6/20	57	7/12	11
1939	6/22	602	6/22	2,055*	6/23	341	6/23	129	6/12	31	6/2	33*
1938	7/23	558*	-	-	7/25	214	7/25	75	6/23	548	9/15	16
1937	-	-	-	-	7/24	602*	9/9	65*	6/11	709*	9/28	40*
1936	-	-	-	-	-	-	-	-	6/10	1,021*	-	-

*First check; older bushes also removed at same time.

TABLE 3

ONE-YEAR SURVIVAL OF RIBES SEEDLINGS ON SUNDRY PLOTS, 1941-42

Area	Plot Designation	Area of Plot in Acres	Year of First Tradiation	CSS 1942	CSS 1941	One-Year-Olds 1942	Percent Survival 1941-42
Cow Creek, Stanislaus N.F.	A	30	1933	341	184	84	45.6
	B	28		1,052	472	152	32.2
	C	21		279	279	50	17.9
	D	4.875		10	8	None	-
Chowchilla Mt.	E	12	1935	753	699	135	19.3
Sierra N.F.	F	12		254	406	66	16.2
1.6-Acre Seedling Occurrence Plot, Cow Creek, Stanislaus N.F.	I	60	1930	210	150*	21	14.0
	II	210		1,085	460*	291	63.3
	III	300		1,215	290*	224	77.2
	IV	200		710	190*	173	91.0
	V	200		250	75*	63	90.7
Butt Creek Campsite, Plumas N.F.	I	25	1935	**	68	7	10.3
	II	24		**	111	1	0.9

*These numbers are rough estimations, and probably considerably too small.

**Because of late date of 1942 check these numbers would be misleading, and are therefore omitted.

TABLE 4

REGENERATION OF RIBES ON BURNS IN VICINITY OF COW CREEK GUARD STATION, STANISLAUS NATIONAL FOREST, CALIF.

Plot Designation	Approx. Area of Plot	Year of Burn	Total Known Live Ribes Bushes in 1942. Years of Origin				Total Known Ribes, All Ages, in Years as Shown								
			1937	1938	1939	1940	1941	1942	1937	1938	1939	1940	1941	1942	
MC #12 (C.F.T.S.) Cow Creek area, Stanislaus N.F.	Milacre Subplots	1936	73	13	4	-	-	-	-	253	172	151	101	91	90
	Staked Seedlings	1936	308	70	17	-	-	3	*	*	*	*	*	*	398
	Small Soot Burn	1940	-	-	-	-	17	1	-	-	-	-	-	19	18
Cow Creek Road, Soot Burn	0.15 a.	1937	-	110	8	-	-	1	-	-	610	303	148	123	119

*This series of data not available.

TABLE 5

GROWTH OF STAKED SEEDLING-ORIGIN RIBES ON BURNED PORTION OF MC#12 (COW CREEK
5.6-ACRE PLOT)

Series of Bush Stakes and Year Staked	Years of Bush Ori- gin	Years of Check	Size Distribution of Bushes, Live Stem								Total Live Staked Bushes	Live Stem (Ft.)	Av. Size Bush FLS
			0- 4.9"	5- 11.9"	12- 35.9"	36- 71"	72- 143"	12'- 24.9	25'- 39.9	40'+			
AA-CV (1937)	1937	1937	50	20	4	-	-	-	-	-	74	27.0	0.4
		1938	6	28	24	9	2	-	-	-	69	113.2	1.6
		1939	-	10	32	18	3	4	2	-	69	279.3	4.0
		1940	1	6	21	23	9	8	1	-	69	375.5	5.4
		1941	-	5	14	16	20	9	3	2	69	615.6	8.9
		1942	-	5	14	22	14	8	4	2	69	603.3	8.2
DA-IH (1938)	1937	1938	50	42	9	-	-	-	-	-	101	50.5	0.5
		1939	24	34	31	7	1	-	-	-	97	114.8	1.2
		1940	16	21	31	15	6	1	-	-	90	183.3	2.0
		1941	5	24	33	15	10	3	-	-	90	277.1	3.1
		1942	4	26	31	13	12	3	1	-	90	303.5	3.4
JB-OD (1939)	1937	1939	5	40	36	5	2	-	-	-	88	126.8	1.4
		1940	5	15	44	13	8	-	-	-	85	210.0	2.5
		1941	1	9	36	22	14	3	-	-	85	337.9	4.0
		1942	1	6	33	26	11	6	1	-	84	391.9	4.7
	1938	1939	11	20	7	-	-	-	-	-	38	26.2	0.7
		1940	5	12	17	2	-	1	-	-	37	57.8	1.6
		1941	1	12	16	5	1	2	-	-	37	100.3	2.7
		1942	-	9	18	6	2	1	-	1	37	141.4	3.8
	1939	1939	1	5	-	-	-	-	-	-	6	2.8	0.5
		1940	-	-	4	1	-	-	-	-	5	8.8	1.8
		1941	-	-	2	3	-	-	-	-	5	15.4	3.1
		1942	-	-	2	1	2	-	-	-	5	25.2	5.1
OE-QI (1940)	1937	1940	7	17	8	4	-	-	-	-	36	39.1	1.1
		1941	5	16	12	2	1	-	-	-	36	45.0	1.3
		1942	3	15	13	-	3	-	-	-	34	110.5	3.3
	1938	1940	4	7	1	-	-	-	-	-	12	6.1	0.5
		1941	1	6	5	-	-	-	-	-	12	10.4	0.9
		1942	-	7	5	-	-	-	-	-	12	12.5	1.0
	1939	1940	3	3	2	-	-	-	-	-	8	5.4	0.7
		1941	-	2	4	1	-	-	-	-	7	10.1	1.4
		1942	-	1	4	2	-	-	-	-	7	16.3	2.3
QJ-RS (1941)	1937	1941	6	17	3	1	-	-	-	-	27	19.8	0.7
		1942	8	11	5	1	-	-	-	-	25	21.3	0.9
	1938	1941	3	4	1	-	-	-	-	-	8	4.8	0.6
		1942	1	4	3	-	-	-	-	-	8	6.9	0.9
	1939	1941	-	1	-	-	-	-	-	-	1	0.7	0.7
		1942	-	-	1	-	-	-	-	-	1	1.5	1.5
RT-SP (1942)	1937	1942	4	1	1	-	-	-	-	-	6	2.9	0.5
	1938	1942	11	2	-	-	-	-	-	-	13	3.8	0.3
	1939	1942	3	1	-	-	-	-	-	-	4	1.8	0.4
AA-CV	All	1937	50	20	4	-	-	-	-	-	74	27.0	0.4
AA-IH		1938	56	70	33	9	2	-	-	-	170	163.7	1.0
AA-OD		1939	41	109	106	30	6	4	2	-	208	540.9	1.8
AA-QI		1940	41	81	128	58	23	10	1	-	342	886.0	2.6
AA-RS		1941	22	96	126	65	46	17	3	2	377	1,437.0	3.8
AA-SP		1942	35	88	130	71	44	18	6	3	395	1,642.8	4.2

TABLE 6

RIBES FOUND ON ONE-ACRE REGENERATION PLOTS IN 1942

Name of Plot	N.F.*	Date of Last Check in 1942	Year of Graduation	Estimated Live Stem**			Size Distribution of Known and Mapped Bushes (Live Stem)										Total Bushes Plotted on Map	Additional Unplotted Seedlings		
				CSS	OLS	TLS	Mapped Bushes					Known Bushes						CSS	Older	Total
							0-4"	5-11"	12-35"	36-71"	72-143"	12'-24'	12'-25'	25'+						
Shaver Timber	S	7/11	1939	5	15	20	10	4	9	-	-	-	-	23	252	11	263			
Blue Canyon	S	7/13	1940	21	62	83	17	34	25	4	-	-	-	80	50	20	70			
Pilot Peak	S	6/10	1940	38	121	159	6	24	37	11	3	1	-	82	5	11	16			
Signal Peak	S	6/11	1939	100	524	624	27	64	101	35	17	8	-	254	153	-	153			
Inter-Road	P	8/5	1940	36	44	80	9	9	7	6	2	1	-	34	34	7	46			
Gentle Gully	P	8/6	1940	227	217	444	36	57	90	24	12	2	1	222	156	109	265			
Rock Creek	P	8/3	1940	15	31	46	31	15	9	1	2	-	-	58	9	21	30			
Fanianni Timber	P	7/28	1940	18	21	39	-	2	11	1	2	-	-	16	-	-	-			
Totals				460	1,035	1,495	136	209	289	82	40	12	1	769	664	179	843			
Averages				58	129	187	17	26	36	10	5	2	-	96	83	22	105			

*S = Sierra National Forest, and P = Plumas National Forest.

**CSS = current season stem, OLS = all older live stem, and TLS = total live stem.

TABLE 7

RIBES REGENERATION DATA FROM GRAZING ENCLOSURE PLOTS ON STANISLAUS AND SIERRA NATIONAL FORESTS

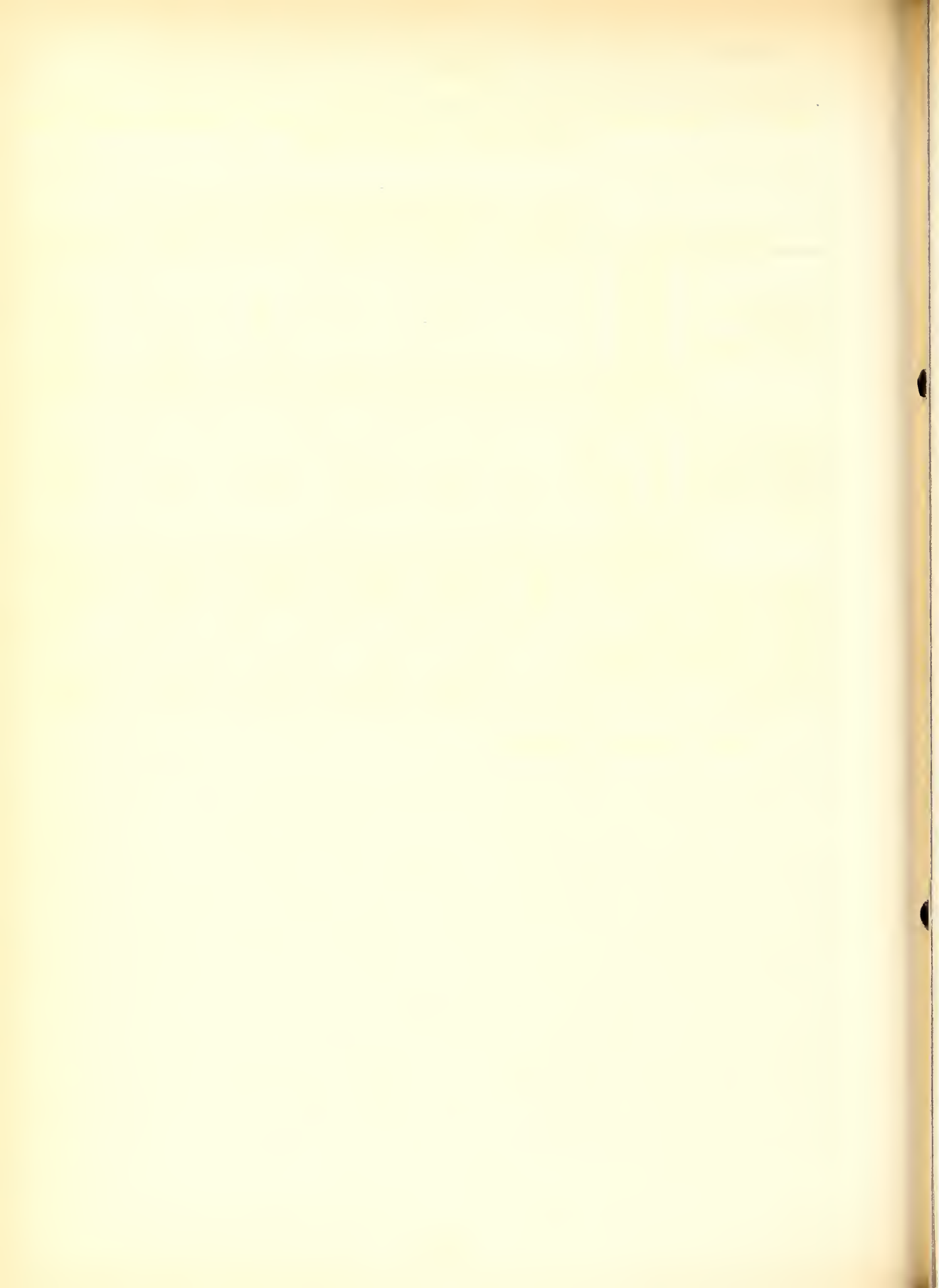
Plot Area	Type of Eradication Hand or Oil	Total Ribes Seedlings Found at Checks								Percent Seed- ling Survival to Fall of 1942		Av. Inches of Live Stem Per Seedling, Fall 1942	
		1941 Origin				1942 Origin				1941- Origin Ribes	1942- Origin Ribes	1941- Origin Ribes	1942- Origin Ribes
		Spring 1941	Fall 1941	Spring 1942	Fall 1942	Spring 1942	Fall 1942	Spring 1942	Fall 1942				
Cow Creek Area, Stanislaus N.F.	Hand Inside	615	189	64	59	586	106	586	106	9.6	18.1	5.6	0.9
	Hand Outside	317	73	37	29	728	147	728	147	9.2	20.2	4.0	0.8
	Oil Inside	433	235	112	111	187	47	187	47	25.6	25.1	5.2	0.8
	Oil Outside	468	145	103	93	953	156	953	156	19.9	16.4	5.2	1.0
	Total Hand	932	262	101	88	1,314	253	1,314	253	9.4	19.3	5.1	0.8
	Total Oil	901	380	215	204	1,140	203	1,140	203	22.6	17.8	5.2	0.9
	Total Inside	1,048	424	176	170	773	153	773	153	16.2	19.8	5.4	0.9
Chowchilla Mt. Area, Sierra N.F.	Total Outside	785	218	140	122	1,681	303	1,681	303	15.5	18.0	4.9	0.9
	Plot Total	1,833	642	316	292	2,454	456	2,454	456	15.9	18.6	5.2	0.9
	Hand Inside	992	426	206	147	545	44	545	44	14.8	8.1	6.5	1.0
	Hand Outside	987	171	90	34	338	127	338	127	3.4	37.6	5.3	1.1
	Oil Inside	941	212	93	50	311	50	311	50	5.3	16.1	7.7	1.2
	Oil Outside	770	237	149	78	524	156	524	156	10.1	29.8	8.9	1.2
	Total Hand	1,979	597	296	181	883	171	883	171	9.2	19.4	6.3	1.1
Total Inside	Total Oil	1,711	449	242	128	835	206	835	206	7.5	24.7	8.4	1.2
	Total Inside	1,933	638	299	197	856	94	856	94	10.2	11.0	6.8	1.1
	Total Outside	1,757	408	239	112	862	283	862	283	6.4	32.8	7.8	1.2
	Plot Total	3,690	1,046	538	309	1,718	377	1,718	377	8.4	21.9	7.2	1.2

TABLE 8

FRUITING BUSHES OF RIBES ROEZLI REMOVED FROM PLOT G (24 MILACRES), CHOWCHILLA
MT., SIERRA NATIONAL FOREST

Items of Data		Dates of Inspection					Totals
		July 26, 1938	June 24, 1939	May 21, 1940	June 27, 1941	July 9, 1942	
Estimated Years of Ribes Origin	1933	1	1	*	-	-	2
	1934	2	4	*	-	-	6
	1935	-	19	*	19	-	38
	1936	7	64	*	84	6	161
	1937	-	2	*	114	30	146
	1938	-	-	*	5	7	12
	Total	10	90	*	222	43	365
Size Distri- bution of Removed Ribes Feet of Live Stem	(Ft.)						
	0- 1.9	-	-	1	-	-	1
	2- 5.9	-	5	49	52	-	106
	6- 15.9	3	48	115	155	23	344
	16- 40	5	31	33	15	20	104
	41-100	1	6	1	-	-	8
	101-500	1	-	-	-	-	1
	Total	10	90	199	222	43	564
Total Estimated Live Stem Removed, and Av. Size Removed Ribes		308 30.8'	1,655 18.4'	2,107 10.6'	1,940 8.7'	643 15.0'	6,653 11.8'
Total Estimated Fruits Removed, and Av. Number Per Fibes		* *	2,103 23	7,029 35	1,516 7	211 5	10,859 19.6

*These data not recorded.



SECTION III. FIELD WORK IN METHODS OF RIBES ERADICATION FOR 1942

1. Methods of Rapid Coverage of Areas Light in Ribes.

In blister rust control work it has been common practice to use "scout crews" on areas of light Ribes population especially where the ground cover in such areas is open and where the detection of Ribes is easy. Since much of our second and third eradication work will be on areas with few Ribes, it seemed advisable to test some recent ideas on methods of rapid ground coverage. A trial of the "checker-flanker" method conducted during the past field season was designed to show the types of areas which can be safely worked by a fast traveling crew, and to determine cost per acre, the reduction of bushes and feet of live stem per acre, and the possibility of substituting for a portion of the regular check a careful inspection of bush and live stem data obtained by post-check and crews. Checker-flanker methods have previously been used with success in Idaho.

Methods used for checker-flanker work. The crew consisted of one checker and 4 eradicators. The checker ran a standard post-check strip, took the usual data, and made the regular maps. In addition, the checker recorded on a special form (EQ-435), by 5-chain transects, the number of bushes and feet of live stem removed and reported by the 4 flankers.

Two flankers on each side of the checker systematically covered a strip 5 chains wide (2 1/2 chains on each side of the checker) and eradicated all Ribes, including those found on the check strip. The number of bushes and the feet of live stem removed were noted by the flankers and the totals were reported to the checker when each successive 5-chain transect point was reached. Crew counts were therefore recorded for subplots of 25 square chains. An attempt was made to cover, at least visually from a reasonable distance, 100 percent of the 5-chain strip. When patchy brush or thickets made the hundred percent coverage impossible at this rapid rate of travel, all better-than-average Ribes sites and all logging disturbances were examined. The flanker farthest from the checker toward the unworked portion of the area carried a roll of toilet tissue in a one-quart canteen cover and hung up a few sheets in a conspicuous place every chain or two.

The area worked. Parts of 4 sections, totaling 930 acres, were worked from the Soda Springs blister rust control camp on the Lassen National Forest, using the checker-flanker method of eradication. The first quarter section worked was considered as a training area, and data from this portion of land are not shown in table 1. The 770 acres for which data are shown in table 1 were worked initially by CCC crews in 1938 and the greater part logged immediately thereafter. A small amount of the area had been logged just prior to initial eradication. Ground cover on this area can be classed as light. The topography is generally rolling, but the area has a few steep slopes. Logging disturbance for the most part was not heavy and regeneration of Ribes following the logging has been light. The initial population of Ribes removed averaged from 20 to 50 bushes per acre. Prior to logging the Ribes were on the decline and still are not increasing on parts of the area. About 40 years ago the entire area had been logged lightly with oxen, but it now has completely recovered from this disturbance.

Parts of 3 sections, totaling 1,189 acres, were worked from the Big Trees blister rust control camp on the Stanislaus National Forest in a manner similar to the Soda Springs work, the principal difference being that the flankers did not estimate live stem, a bush count by 5-chain transects being the only data taken.

FIGURE 1

SUMMARY BY 40- AND 160-ACRE BLOCKS OF CHECKER-FLANKER STUDY,
LASSEN NATIONAL FOREST, CALIFORNIA, 1942

	Bu/FLS Per Acre Post Check	Bu/FLS Per Acre Crew Work	Bu/FLS Per Acre 1st Regular Check	Overrun + Underrun-
Sec. 13 NE 1/4	$\begin{array}{r l} 7 & 6.5 \\ \hline 25.5 & 33 \\ \hline 15.9 & \\ 67 & \end{array}$ $\begin{array}{r l} 26.5 & 23.5 \\ \hline 61 & 148.5 \end{array}$	$\begin{array}{r l} 4.8 & 4.3 \\ \hline 21.3 & 32.7 \\ \hline 9.9 & \\ 63.6 & \end{array}$ $\begin{array}{r l} 10.5 & 20.2 \\ \hline 47.2 & 153.3 \end{array}$	$\begin{array}{r l} 10.5 & 4 \\ \hline 28 & 6 \\ \hline 7.2 & \\ 16 & \end{array}$ $\begin{array}{r l} 3 & 11 \\ \hline 3 & 27 \end{array}$	$\begin{array}{r l} -2.2 & -2.2 \\ \hline 4.2 & 0.3 \\ \hline -6 & \\ 3.4 & \end{array}$ $\begin{array}{r l} -16 & -3.3 \\ \hline 13.8 & +4.8 \end{array}$
Sec. 13 SW 1/4	$\begin{array}{r l} 2.5 & 20 \\ \hline 3.5 & 79.5 \\ \hline 13.7 & \\ 73.6 & \end{array}$ $\begin{array}{r l} 3.5 & 29 \\ \hline 22.7 & 138.5 \end{array}$	$\begin{array}{r l} 1.4 & 17.6 \\ \hline 8.1 & 114.4 \\ \hline 10.4 & \\ 76.6 & \end{array}$ $\begin{array}{r l} 4.7 & 17.8 \\ \hline 38.3 & 145.6 \end{array}$	$\begin{array}{r l} 2.5 & 2 \\ \hline 3.5 & 8 \\ \hline 3 & \\ 12.5 & \end{array}$ $\begin{array}{r l} 1 & 6.5 \\ \hline 2.5 & 36 \end{array}$	$\begin{array}{r l} -1.1 & -2.4 \\ \hline +1.6 & +64.9 \\ \hline -3.3 & \\ +3.0 & \end{array}$ $\begin{array}{r l} +1.2 & 11.2 \\ \hline +15.6 & 12.9 \end{array}$
Sec. 24 NW 1/4	$\begin{array}{r l} 0 & 18 \\ \hline 0 & 97.5 \\ \hline 13.7 & \\ 90.4 & \end{array}$ $\begin{array}{r l} 16.5 & 20.5 \\ \hline 72.5 & 191.5 \end{array}$	$\begin{array}{r l} 2.2 & 19.9 \\ \hline 18.4 & 162.1 \\ \hline 10.9 & \\ 84.6 & \end{array}$ $\begin{array}{r l} 8.9 & 12.5 \\ \hline 56.4 & 101.5 \end{array}$	$\begin{array}{r l} 0.5 & 2 \\ \hline 0.5 & 2.5 \\ \hline 1.0 & \\ 14.7 & \end{array}$ $\begin{array}{r l} 2.5 & 2.7 \\ \hline 13.5 & 42.5 \end{array}$	$\begin{array}{r l} 2.2 & 1.9 \\ \hline +18.4 & +64.6 \\ \hline -2.8 & \\ 5.8 & \end{array}$ $\begin{array}{r l} 7.6 & 8 \\ \hline 16.1 & 90 \end{array}$
Sec. 19 NE 1/4	$\begin{array}{r l} 2.5 & \\ \hline 26.5 & \\ \hline 7.5 & \\ 62 & \end{array}$	$\begin{array}{r l} 2.7 & \\ \hline 18.7 & \\ \hline 5.8 & \\ 58.7 & \end{array}$	$\begin{array}{r l} 2.5 & \\ \hline 6 & \\ \hline 2.5 & \\ 3.5 & \end{array}$	$\begin{array}{r l} +0.2 & \\ \hline -7.8 & \\ \hline 1.7 & \\ 3.3 & \end{array}$
Sec. 20 NW 1/4	$\begin{array}{r l} 3 & 34 \\ \hline 4.5 & 146.5 \\ \hline 20.4 & \\ 75.1 & \end{array}$ $\begin{array}{r l} 18.5 & 26 \\ \hline 71 & 78.5 \end{array}$	$\begin{array}{r l} 2 & 17.7 \\ \hline 6.9 & 115.1 \\ \hline 12.2 & \\ 63 & \end{array}$ $\begin{array}{r l} 9 & 20.1 \\ \hline 40.7 & 89.4 \end{array}$	$\begin{array}{r l} 3.5 & 10.5 \\ \hline 5 & 17.5 \\ \hline 6.4 & \\ 12.7 & \end{array}$ $\begin{array}{r l} 5.5 & 6 \\ \hline 18 & 10.5 \end{array}$	$\begin{array}{r l} -1 & 16.3 \\ \hline +2.4 & 31.4 \\ \hline 8.2 & \\ 12.1 & \end{array}$ $\begin{array}{r l} 9.5 & -5.9 \\ \hline 30.3 & +10.9 \end{array}$

Green = block out
 Red = rework

TABLE 1

A. Summary of Checker-Flanker Study - Soda Springs Camp, Lassen National Forest, 1942

Sec.	Acres	Acres Re-work	Per- cent Re-work	M/D Flan- ker	M/D Check- er	Bushes Per Acre		FLS Per Acre		Flankers Only		Flanker + Checker	
						Post	Crew	First Reg.	Post	Bu/MD	A/MD	A/MD	A/MD
13	320	50	15.6	24.5	5.87	14.8	10.2	5.7	70.3	142.9	13.1	10.5	54.5
24	160	24	15.0	11.5	2.87	13.7	10.9	1.9	90.4	152.3	13.9	11.1	55.6
19	100	0	0.0	5.0	1.25	4.2	4.0	1.4	36.6	79.6	20.0	16.0	80.0
20	190	0	0.0	13.0	3.0	20.4	12.2	6.4	75.1	196.7	14.6	11.7	58.5
Total	770	74	9.61	54.0	13.0	14.6	10.6	4.5	69.2	151.7	14.2	11.5	59.2

B. Analysis of Above by Control Standards*

Sec.	No. 1 (Block Out)				No. 3				No. 4			
	Acres	Per- cent	Bu/FLS Per Acre		Acres	Per cent	Bu/FLS Per Acre		Acres	Per- cent	Bu/FLS Per Acre	
			Post	Crew			Post	Crew			Post	Crew
13	60	18.7	1.7 2.3	2.2 12.3	100	31.2	21.0 116.4	15.3 120.2	160	50.0	15.9 60.5	9.9 63.6
24	30	18.7	0 0	2.3 22.3	20	12.5	10.0 26.0	12.3 30.3	110	68.7	18.2 126.7	14.4 112.3
19	50	50.0	0.7 5.4	2.0 11.0	50	50.0	8.9 73.8	6.0 54.5	-	-	-	-
20	75	39.5	6.0 14.0	4.6 17.9	9	4.7	74.0 226.0	49.5 152.3	106	55.8	20.6 114.2	16.7 91.2
Total	215	28.0	2.7 6.8	3.1 15.3	179	23.3	19.0 80.8	14.0 93.4	376	48.7	17.9 95.0	13.1 85.6

*There were no areas classified as #2 or #5 standard.

++ = no regular check.

Discussion of data. The Soda Springs data were summarized by 21/2-, 10-, 40-, and 160-acre blocks from post-check, crew, and first regular check records. Figure 1 showing bushes over feet of live stem, compares data for post-check, crew count, and regular check on a basis of 40- and 160-acre blocks. The portion of the chart designated as "overrun and underrun" indicates the departure of the crew counts from the post-check. Overrun, where crew counts exceeded the post-check, is shown as a plus figure, and underrun, where crew counts were less than the post-check is shown as a minus figure. Figures on cost of production are shown in table 1, part A. An accurate breakdown of costs to areas smaller than quarter sections is not possible from the recorded field data. Part B of table 1 shows the relationship between bushes and feet of live stem for areas classified by the usual control standards.

Figures on cost of production for the Big Trees area are shown in table 2. Since feet of live stem data were not taken by the flankers and the regular check was not completed, a full analysis of data for this area was not possible.

TABLE 2

SUMMARY OF CHECKER-FLANKER STUDY, BIG TREES CAMP, STANISLAUS NATIONAL FOREST, 1942

Sec.	Acres	Flankers MD	Checker MD	Flankers Only			Checker Only Acres/ MD	Flankers and Checker, Acres/MD	Post Check Bu/Acre
				Bu/Acre	Bu/ MD	Acres/ MD			
12	69	4.0	1.0	9.3	160.7	17.2	69.0	13.8	12.1
7	612	42.5	10.6	25.5	367.5	14.4	57.6	11.5	16.0
6	508	27.5	6.9	6.1	112.5	18.6	73.8	14.7	7.7
Total	1,189	74.0	18.5	16.3	261.6	16.1	64.3	12.8	12.2

An over-all average of 14.25 acres per man-day for eradication (Soda Springs area) can be considered very good. The figure 9.6 percent rework for all acres covered is excellent. After deducting the 28 percent blackout, which would not have been worked in a normal eradication job, the figure of 13.3 percent rework for the remainder is still excellent. Elimination of blackout as indicated by the post-check (see figure 1) would have saved 15 man-days based on the over-all production rate. With section and quarter lines already in, 232.5 chains of line would have been needed to delimit the blackout area, i.e., nearly 3 miles of line requiring about one man-day to string. The over-all per acre average was 3 bushes for 15.3 feet of live stem for all block-out area with the heaviest area showing 2.3 bushes for 22.3 feet of live stem on 30 acres. The checker's figure of 59.2 acres per man-day is an average of about 1 1/2 strip miles per day.

The general average by the Big Trees camp of 16.1 acres per man-day is very encouraging and it is regrettable that the objectives of eradication and methods study could not have been combined as they were at Soda Springs, thus permitting a complete analysis of data.

It is interesting to note that whenever the crews showed an appreciable overrun of bushes or live stem the area passed the regular check. The opposite

condition, however, does not hold. Considerable underrun does not necessarily mean that rework is needed. This condition is readily understood if one considers the source of the data. Crew work is 100 percent coverage and only subject to correction because of missed bushes. Previous records show that an eradication crew will rarely miss more than 15 percent of the bushes. The post-check is a 5 percent sample and is subject to correction because of missed bushes; in addition, the statistical error of a fractional sample must be applied. Apparently an overrun on the part of the crews compensates for the possibility of sampling error in post-check data and makes predictions on remaining *Ribes* populations reasonably reliable. When the crew count is less than the checking figure, it becomes more difficult to say with certainty that the crew work has attained or fallen below the required standard because our margin for error is substantially larger. If the crew underrun and a low post-check coincide on the same area, we are actually faced with a total error considerably greater than the expected deviation of the sampling error.

Analysis by 2 1/2 and 10-acre blocks resulted in poor correlation between the two types of data. Because of pacing variations, adjacent blocks are thrown out of alignment. Moreover the 5 percent check does not give dependable results on such small blocks. Since the crew data are based on 100 percent coverage and are chiefly subject to error through missing bushes, it is doubtless nearer the actual number of bushes present on the ground more of the time than any method of fractional sampling. This statement is made only with respect to light *Ribes* populations and for crews of dependable caliber. Formal statistical calculations bear out this assumption in that post-check with a mean of 14.7 bushes per acre had a standard deviation of 3.3 while crew counts on the same blocks with a mean of 10.12 had a standard deviation of 1.6.

The data presented in table 1 and the discussion just concluded indicate that in many cases the post-check data and the crew counts together could be used to predict the regular check figures. Perhaps on certain areas careful bush counts by reliable crews would make the regular check unnecessary.

The usual procedure of completing the post-check prior to crew work allows blocking out of areas low in *Ribes* and permits utilization of some labor to better advantage. Areas on the borderline between blockout and work category could be scouted by fast crews and the greater portion of these questionable areas declared worked to standard by comparison of a post-check and crew data.

The increasing shortage of experienced men of checker- and crew-leader caliber suggests the multiple use of these key men. As used in this study the checker-flanker system is promising from a multiple use standpoint.

2. Results of Work Done Prior to 1942.

Results of dosage tests of Diesel oil and new oil mixtures on small *Ribes roezli* plants and the effect of oil on the viability of *Ribes* seeds and seedling establishment were again noted in 1942. The 29 fenced milacre plots established in 1938 on Chowchilla Mountain, Sierra National Forest, were rechecked on August 8, 1942. Cumulative results for the plots are shown in table 3. Vegetation other than *Ribes* is beginning to establish itself on the plots. New seedlings are rare and old bushes are gradually being removed as they start to bear fruit.

The 6 milacre plots treated with Diesel oil in 1937 at Boggy Meadows, Sierra National Forest, were examined October 16, 1942. Cumulative data are shown in table 4. The 1942 check is the first to show survival of seedlings on the 3- and 5-gallon plots from a previous year. No seedlings became established on any of these plots in 1942.

Tests of Hauck Pre-Heating Torch. The R. roezli and R. nevadense burned November 4-5, 1941 with the Hauck pre-heating torch were examined June 11, 1942. Table 5 shows length of treatment in minutes and percent of kill. The good results obtained with R. nevadense can be largely attributed to the fact that they were growing in crevices of solid rock. The R. roezli grew in a rocky soil. Soil is a poorer conductor of heat than solid rock and furthermore the Ribes crowns are more deeply embedded in soil than in rock crevices. Relative susceptibility of R. roezli and R. nevadense to heat has not been determined, nor is it necessarily indicated by the data shown in table 5.

RESULTS OF 1938 DOSAGE TESTS ON NEW OIL MIXTURES ON SMALL RIBES ROEZLI BUSHES, CHOWCHILLA MT., SIERRA N. F.,

CALIFORNIA

Plot No.	Dosage in Gals. Per Milacre	Oil Mixture Used	No. Bu. on Plot 1938	Percent Bushes Killed	1939		1940				1941				1942			
					Bu.	CSS*	Non-fruiting Bushes	CSS	Fruiting Bushes Removed	Non-fruiting Bushes	CSS	Fruiting Bushes Removed	Non-fruiting Bushes	CSS	Fruiting Bushes Removed	Non-fruiting Bushes	CSS	Fruiting Bushes Removed
28	0.5		195	90	20	15	10	13	-	15	8	-	15	7	-	-	-	-
1	1.0		43	93	3	-	2	-	-	-	-	-	-	-	2	-	-	-
2	1.5	SO ₂	105	96	4	2	1	4	2	2	2	2	2	2	-	-	-	2
3	2.0	extract	55	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	3.0		70	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	5.0		137	99	1	-	1	-	-	1	-	-	-	-	-	-	-	1
6	10.0		94	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	1.0		18	83	3	1	1	-	1	1	1	1	1	-	-	-	-	-
8	1.5		85	96	3	8	1	-	-	1	-	1	-	-	1	-	-	-
9	2.0	Diesel	76	93	5	4	4	-	-	3	4	-	3	-	4	4	-	-
10	3.0	oil	56	100	-	-	1	-	-	2	-	-	2	-	-	2	-	-
11	5.0		59	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	10.0		35	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	1.0	Diesel	58	71	17	54	25	26	-	23	15	-	23	18	-	17	18	3
14	1.5	oil	94	91	8	17	10	9	-	7	1	-	7	3	-	6	3	4
15	2.0	+	21	81	4	9	4	13	-	4	-	-	4	3	-	2	3	2
16	3.0	Crude	109	100	-	1	-	-	-	1	-	-	1	-	-	1	-	-
17	5.0	oil	110	95	5	1	4	8	1	2	-	1	2	-	3	1	-	1
18	10.0		65	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	0.5	SO ₂	57	100	-	24	4	38	-	-	1	-	-	-	-	-	-	-
19	1.0	extract	77	92	6	93	19	46	-	16	2	-	16	3	-	15	-	-
20	1.5	+	210	94	13	22	22	14	-	17	-	-	17	-	2	14	-	2
21	2.0	Diesel	23	96	1	7	1	36	-	6	1	-	6	-	-	3	-	-
22	3.0	oil	46	100	-	3	1	3	-	1	-	-	1	-	-	1	-	-
23	5.0		127	100	-	-	-	5	-	-	-	-	-	-	-	-	-	-
24	10.0		135	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	0	Control	209	None	212	87	190	41	13	134	-	4	140	-	4	140	-	12
26	0		25	None	25	137	27	96	13	8	1	8	7	3	8	7	3	2
27	0		170	None	202	81	156	15	12	154	7	4	143	-	4	143	-	6

* Current season seedlings.

TABLE 4

RESULTS OF DOSAGE TESTS OF DIESEL OIL ON SMALL RIBES ROEZLI PLANTS AND THE EFFECT OF OIL ON THE VIABILITY OF SEED PLOTS AT BOGGY MEADOWS, SIERRA N. F., CALIFORNIA - TREATED IN 1937

1937 Dosage, Gals. Plot Per Mil- acre	Aug. 10, 1938 Seedlings	June 30, 1939			June 13, 1940			June 30, 1941			October 16, 1942		Remarks
		1938 Seed- lings	1939 Seed- lings	Other Vege- tation	1939 Seed- lings	1940 Seed- lings	Other Vege- tation	1941 Seed- lings	Other Vege- tation	1942 Seed- lings			
1 0.5	Numerous	-	62	Good	-	193	Good	-	Good	-	-	-	Herbs and grass are be-
2 1.0	Few	-	107	Good	-	159	Good	-	Good	2	-	-	coming estab-
3 1.5	Few	-	21	Fair	2	32	Good	-	Fair	-	-	-	lished on all
4 2.0	None	-	6	Fair	3	109	Fair	-	Fair	2	-	-	plots.
5 3.0	None	-	-	None	-	19	Poor	-	Fair	2	-	-	Continuous
6 5.0	None	-	-	None	-	6	Poor	-	Poor	4	-	-	disturbance by cattle.

TABLE 5

RESULTS OF BURNING TESTS ON R. ROEZLI AND ROCKBOUND R. NEVADENSE, SOUTH FORK FEATHER RIVER, PLUMAS N. F., CALIF.

Ribes Species	No. of Ribes Treated and Number Killed														Total		Av. Per- cent Kill
	Duration of Treatment in Minutes														Bush- es		
	1/2	1	1 1/2	2	2 1/2	3	4	8	T	K	T	K	T	K	T	K	
R. nevadense	-	-	-	-	8	6	-	10	8	5	4	-	-	23	18	78.3	
R. roezli	1	1	5	7	0	18	6	1	0	15	5	15	2	5	27	27.3	
Total	1	1	5	7	0	26	12	1	0	25	13	20	6	5	210	39.0	

*T = number treated.

K = number killed.

Tractor work. Examination of upland eradication 1941 tractor work done on the Plumas National Forest, California, showed clearly the necessity of having a skilled operator when the machine is used to root out Ribes with the front end rake. Much of the rake work done with relatively inexperienced operators was too deep. A large amount of dirt in the brush pile encourages survival of the Ribes. Such dirt-filled piles are difficult to rework by hand. An excellent job of eradication resulted when the grapple hooks, powered from the rear end drum, had been used.

The tractor time-study plots at Soquel, Sierra National Forest, were checked October 15-16, 1942. Data are recorded in table 6 for these plots. Seedling regeneration appeared to be correlated more directly with ecologic conditions than with the methods of eradication. Since initial Ribes populations were all very heavy it is evident that resprouts were more numerous following initial hand work.

TABLE 6

RESULTS OF CHECK OF D-2 TRACTOR AND CCC LABOR TIME-STUDY PLOTS, SOQUEL, SIERRA N. F., CALIFORNIA

Plot No.*	Per Acre Averages			Ribes Site (Arranged in Decreasing Order of Favorability to Ribes Regeneration and Growth)	Method of Work
	Seedlings 1941 and 1942	Re-sprouts	Missed Bushes		
7	18,395	1,760	40	Nearly level, abundant moisture, partial shade.	All hand grubbing. No cleanup after wilting.
6	7,335	1,200	105	Nearly level, abundant moisture, some shade.	Do.
1	3,102	267	39	Moderate NE slope, fair moisture, some shade.	Initial by front rake only. Cleanup later by hand.
2	40	38	83	Steep SE slope, little moisture, little shade.	Initial by rear hooks only. Cleanup later by hand.

*Table 3, p. 116 of the 1941 annual report for the Sugar Pine Region shows cost analysis and number of bushes removed initially.





